ANNUAL REPORT

FAPESP

2022

FAPESP 60 YEARS
1962 - 2022

ANNUAL REPORT

FAPESP

2022

FAPESP 60 YEARS 1962 - 2022

YEAR 2022

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STATEMENT BY FAPESP'S BOARD OF TRUSTEES

The Board of Trustees approved FAPESP's 2022 Annual Report at an extraordinary meeting on July 26, 2023, highlighting the progress achieved in various aspects of its performance and recognizing compliance with the guidelines issued by the Board.

The Board also noted a reduction of about 40% in the number of research proposals submitted compared with the pre-pandemic period and the effect of this decrease on the disbursement of funds despite the rise in income. The reduction was acknowledged to be an effect of the pandemic on research activities, reflecting its impact on society.

On the other hand, several initiatives of the Executive Board, undertaken with the consent of the Board of Trustees, increased the future commitment of funding for medium- and long-term projects so as to channel the funds accumulated in the period into research and innovation activities in São Paulo State.

Board of Trustees, FAPESP

In 2022, although the contractionary impact of the COVID-19 pandemic was less severe, it continued to affect research. The number of research proposals submitted to FAPESP was similar to previous years and lower than the annual numbers recorded before the pandemic. Nevertheless, disbursement to support research rose 16.7% compared with 2021, and the number of projects contracted for in the period rose 27.8%.

The highlights of the year included investments in Research for Knowledge Advancement, which accounted for 53.5% of total disbursement. This funding strategy covers large-scale basic and applied research projects such as Thematic Projects, Young Investigators, and Research, Innovation and Dissemination Centers (RIDCs), among others. Its significance is the result of our efforts to increase the research funding opportunities for young researchers via initiatives such as Project Generation and the Initial Π (Pi) Project, extension of Young Investigator Grants from 48 to 60 months, and approval of 54 new Thematic Projects in the period.

Disbursement for all types of grant relating to Training of Human Resources for Science and Technology rose more than 20% compared with 2021.

Investment in Research for Innovation remained unchanged on 8.5% as a proportion of total disbursement. Here, too, it is relevant to note FAPESP's efforts to increase entrepreneurship opportunities via initiatives such as simplification of the procedures for submitting initial projects and the introduction of a new intellectual property policy to ensure that companies supported by PIPE have sole IP rights to the results of their funded research.

Disbursement for Research on Strategic Themes also remained stable. This funding line covers investment in themes such as biodiversity (BIOTA), bioenergy (BIOEN) and climate change, among others, as well as Diffusion, Mapping and Research Evaluation.

Disbursement relating to Support for Research Infrastructure in the state reached $ PPP 58.4 million, or 11% of the total, 1 percentage point more than in 2021, but it should be noted that three calls for large-scale equipment purchase proposals were issued in 2022 for a total of $ PPP 174.4 million and will affect the 2023 results.

The year 2022 involved the consolidation of partnerships, many of them with public bodies, to support research geared to solving specific problems. A good example is PROEDUCA, a program that supports research on basic education and is implemented in partnership with the São Paulo State Department of Education. Its remit is to contribute to the improvement and development of public policies and innovative pedagogical approaches that facilitate learning and reduce educational inequalities.

FAPESP was also responsible for organizing the Amazon+10 Initiative, a hitherto unprecedented partnership involving state research funding agencies (FAPs) led by CONFAP, their national council, and aimed at stimulating collaborative interdisciplinary research on sustainable development of the Amazon region. The first call mobilized researchers in 20 states, with all projects involving at least one principal investigator affiliated with an institution in the Amazon.

In 2022, FAPESP also announced the results of a call for proposals that selected 17 new Science for Development Centers (SDCs), in addition to the 11 already implemented, whereby researchers affiliated with universities and research institutions join forces with managers of state and

municipal government agencies in collaborative problem-oriented projects with social or economic relevance to São Paulo State. The new SDCs will conduct research relating to biopharmaceuticals, innovation in urban public policies, technological innovation for health emergencies, solutions for waste, water security, human and animal diseases, greenhouse gas emissions, and improvements to vaccines, among other areas.

In 2022, three new Engineering Research Centers (ERCs) began operating: one focuses on offshore innovation in partnership with Shell and is hosted by the University of São Paulo (USP); a second focuses on molecular improvement of plants in partnership with the Brazilian Agricultural Research Corporation(EMBRAPA) and is hosted by the State University of Campinas (UNICAMP); and the third focuses immuno-oncology in partnership with GSK and is hosted by the Albert Einstein Jewish-Brazilian Charitable Society (SBIBAE).

Three other ERCs were established in 2022 and scheduled to go live in 2023. Smartness, which will conduct research on smart networks and services for 2030, will be installed at UNICAMP in partnership with Ericsson. Also in long-term innovation, the ERC for Aerial Mobility of the Future (ERC-AMF) will enable Embraer to work with the Aeronautical Technology Institute (ITA), and Braskem, one of the largest producers of thermoplastic resins in the Americas, will partner with UNICAMP and other institutions in research on the agricultural uses of plastics (plasticulture) in shade nets, anti-insect screens, greenhouses and soil cover film, to take just a few examples.

Also in 2022, FAPESP awarded PIPE funding to 224 innovative companies for 578 new projects. Some of the projects were selected in calls for proposals issued in partnership with the São Paulo State Basic Sanitation Corporation (SABESP), the São Paulo branch of the Brazilian Small Business Support Service (SEBRAE-SP), and FINEP, the Brazilian Innovation Agency. In addition, FAPESP participated for the first time in Centelha ("Spark"), a national program to support innovative young entrepreneurs. The program is an initiative of the Ministry for Science, Technology and Innovation (MCTI) and FINEP, in partnership with CONFAP and CERTI Foundation.

FAPESP commemorated its sixtieth anniversary in 2022 with an official ceremony in May, attended by senior academic and government officials. This event was the occasion for announcements of new investments in research totaling $ PPP 383.7 million, including the new ERCs and SDCs, and calls for new RIDC and infrastructure proposals, among others. Also as part of the celebrations, a concert took place on May 30 at Sala São Paulo, featuring USP's Symphony Orchestra, the choirs of the São Paulo Municipal Theater and UNICAMP, and the Percussion Group of the Institute of Arts at São Paulo State University (UNESP). This event showed that São Paulo's universities produce excellent art as well as outstanding science.

Other milestones on the commemorative calendar, which began in 2021, were 17 FAPESP 60 Years Conferences, two FAPESP 60 Years Schools involving 120 postdoctoral scholars from all over Brazil, and two books published in 2022: *FAPESP 60 anos: Ciência, cultura e desenvolvimento*, showing how

the institution has contributed to the advancement of science, culture and development in São Paulo in the past six decades; and *FAPESP 60 anos: A Ciência no desenvolvimento nacional,* edited by the São Paulo State Academy of Sciences (ACIESP), with a collection of articles in which researchers analyze the state of the art in science in the state and examine the opportunities for research in the years ahead.

The winding down of the worst of the pandemic did not reduce FAPESP's visibility in the media at home and abroad, or the public's interest in scientific achievements. In 2022, 53,008 news reports were published about FAPESP or the research projects and researchers it supports, for an increase of 3% compared with 2021. The information sources involved were *Agência FAPESP*, FAPESP Innovative R&D and *Pesquisa FAPESP* magazine.

Overall, FAPESP continues to be a major driver of scientific and technological development in São Paulo State. With universities, research institutions, health bodies, innovative companies and startups, it is contributing to the resumption of creative and productive activities after the disaster represented by the pandemic.

Marco Antonio Zago
President, Board of Trustees, FAPESP

ABOUT THIS REPORT

This *Annual Report* on FAPESP's activities in 2022 details the results of its investment in scientific and technological research using funds transferred by constitutional mandate from the São Paulo State Treasury, and from other sources. It highlights FAPESP's contribution to the advancement of science and innovation in São Paulo, and to the solutions to many economic and social challenges.

The framework for the Report comprises two funding instruments – research scholarships/fellowships and research grants – awarded by FAPESP to further six funding strategies: (1) Training of Human Resources for S&T; (2) Research for Knowledge Advancement; (3) Research for Innovation; (4) Research on Strategic Themes; (5) Support for Research Infrastructure; and (6) Knowledge Diffusion.

These six strategies translate respectively into (1) scholarships/fellowships in Brazil and abroad to support the training of human resources for academic and technological research; (2) support for long-term research, and regular research grants; (3) research conducted in partnership with companies; (4) strategic projects in areas such as biodiversity, bioenergy, climate change, and public policy; (5) support for modernization and conservation of research facilities; and (6) dissemination of scientific and technological research findings.

The indicators of the results of funding instruments are amounts disbursed, numbers of active projects, and numbers of projects contracted for between January and December. These results are presented in the report in Chapters 2, 3 and 5.

The classification of funding instruments (scholarships/fellowships and research grants) by funding strategy provides insight into the objectives of FAPESP's investment in research by accounting for all types of funding linked to approved projects, and distinguishing among support for long- and short-term research projects, projects selected in calls for proposals and projects submitted spontaneously, support for human resource training, and support for scientific exchange and research infrastructure, among others.

HOW THIS REPORT IS STRUCTURED

SÃO PAULO ST&I SYSTEM: indicators for São Paulo State's Science, Technology & Innovation (ST&I) System, giving the reader an overview of the state's importance to scientific and technological development in Brazil.

FAPESP HIGHLIGHTS 2022: A summary of FAPESP's key indicators for the year, as detailed in

the rest of the report, and examples of scientific research projects that were conducted in the period and stand out for their quality and relevance.

CHAPTER 1 – THE INSTITUTION: a description of FAPESP's governance, how it assesses and selects research proposals, the number of projects funded since 1962, and the numbers of reviewers and expert opinions issued.

FAPESP 60 YEARS: main initiatives in 2022.

CHAPTER 2 – GENERAL INDICATORS: tables with information on the composition of FAPESP's income, the annual change in total disbursement since 2016, and indicators of disbursement, active projects and projects contracted for during the year, organized by funding strategy, major knowledge area, institution, and scholarships/fellowships or research grants pertaining to each strategy. The tables include time series for the years 2016-2022 showing total disbursement for each funding strategy, total projects contracted for, and disbursement for scholarships/fellowships and research grants. Key items of budget execution in the year and new funding challenges are also noted in this chapter.

COVID-19 SPECIAL: the volume and profile of scientific production on the subject in São Paulo State, the main sources of funding for researchers affiliated with institutions in the state, and the main COVID-19 collaborative research networks.

CHAPTER 3 – FUNDING STRATEGIES: information on the programs covered by the six research strategies, detailing disbursement, active projects, projects contracted for during the year, and examples of outstanding achievements and research results.

CHAPTER 4 – CONSOLIDATED STATUS OF SCHOLARSHIPS/FELLOWSHIPS AND GRANTS: amount disbursed and total numbers of awards contracted for in all funding lines.

CHAPTER 5 – RESEARCH COLLABORATION AND CO-FUNDING: promotion of collaborative research in Brazil and abroad; co-funding initiatives; investment and partnerships with funding agencies, academic institutions and companies during the year

APPENDIX: lists of the tables and figures in the Report.

SUMMARY

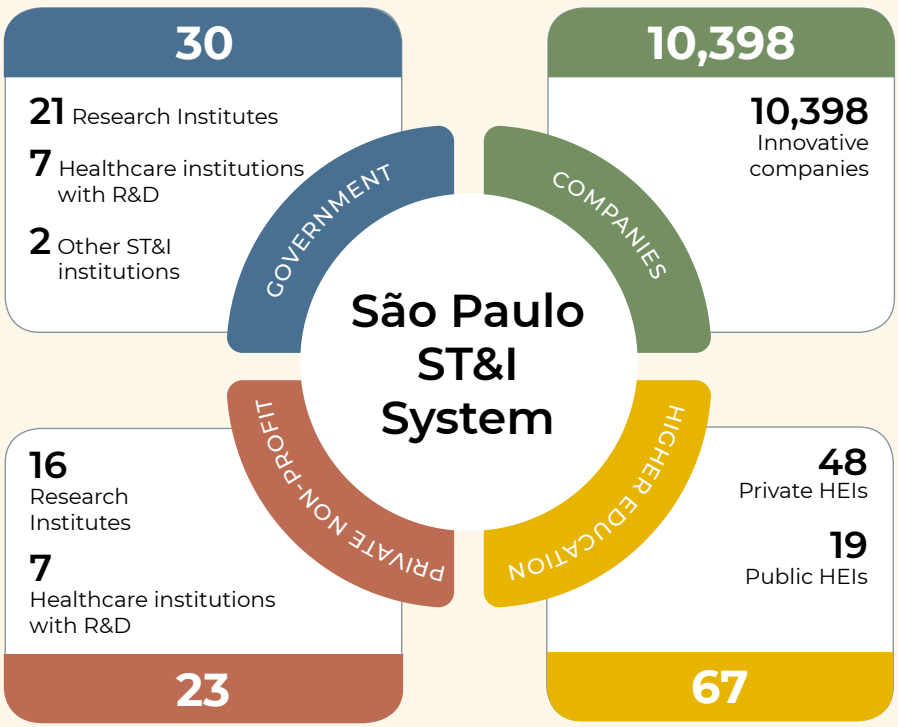
SÃO PAULO ST&I SYSTEM 2022

R&D EXPENDITURE

RESEARCHERS

TRAINING OF HUMAN RESOURCES

SCIENTIFIC PUBLICATIONS



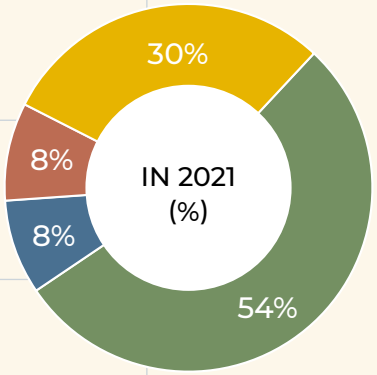
Source: various sources. Chart by FAPESP.

R&D EXPENDITURE IN SÃO PAULO STATE

Type of Institution – São Paulo State (2018-2021)

$ PPP* million

Type of Institution	2018	2019	2020	2021
Higher Education Institutions	3,078.0	3,085.0	2,932.2	3,129.9
Federal HEIs	466.0	492.8	472.3	455.8
State HEIs	2,320.3	2,285.1	2,164.3	2,366.6
Private HEIs	291.7	307.1	295.6	307.5
Funding Agencies	1,163.0	1,106.4	945.2	893.3
CNPq	169.3	157.7	161.2	147.5
CAPES	343.2	308.1	276.1	258.4
FINEP	104.9	89.2	100.3	90.0
FAPESP	545.6	551.4	407.6	397.4
Research Institutes	1,116.1	938.6	871.4	876.8
Federal RI	830.7	662.8	614.7	614.1
State RI	285.4	275.8	256.7	262.7
Companies	5,745.4	5,857.6	5,776.1	5,638.9
Total	11,102.5	10,987.6	10,524.9	10,538.9



Source: various sources. Chart by FAPESP's Studies & Indicators Unit (GEI).

Note: estimated R&D expenditure is based on the methodology traditionally used by FAPESP, considering administrative records from different sources to estimate expenditure by higher education and research institutions located in São Paulo State. Estimates of expenditure by funding agencies considered FAPESP's expenditure and the expenditure of federal agencies on projects and programs targeting São Paulo State. Estimates of corporate expenditure on in-house R&D were calculated on the basis of the 2017 PINTEC survey, both to arrive at the total for São Paulo using the sectoral structure of nationwide expenditure for the year, and to produce estimates for subsequent years based on variations in value added for selected segments of IBGE's system of regional accounts and quarterly GDP according to SEADE. This methodology does not consider healthcare institutions that do R&D or private research institutions.

RESEARCHERS IN SÃO PAULO STATE

Type of Institution – 2018 and 2020

Type of Institution	2018	2020
Research Institutes	4,339	4,071
Higher Education Institutes	39,007	36,233
Healthcare Institutions with R&D	2,978	3,837
Companies	33,721	33,427
TOTAL	**80,045**	**77,568**

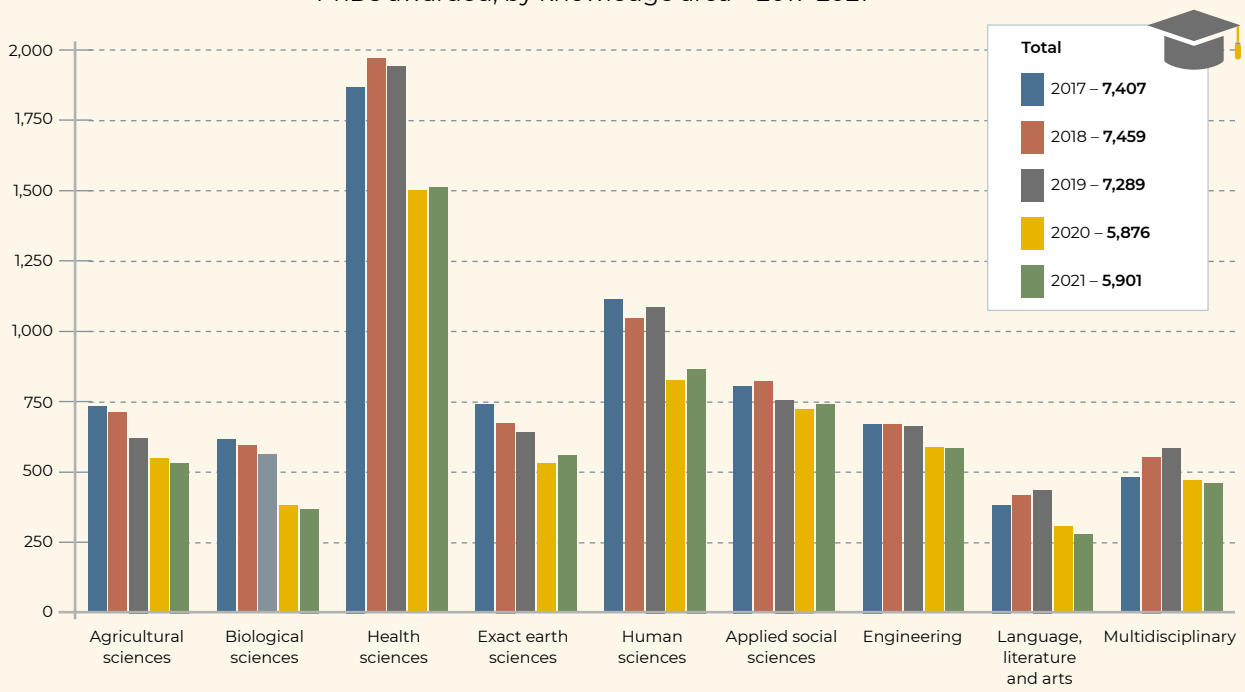
Note: estimated numbers of researchers in companies are subject to revision as new data becomes available.

Source: for researchers, data supplied by the institutions with which they were affiliated in FAPESP's primary surveys for 2018 and 2020. Values include awardees of PhD and postdoctoral scholarships registered in the databases of FAPESP, CAPES and CNPq. For corporate researchers, values were estimated by GEI-FAPESP on the basis of IBGE's 2017 PINTEC survey.

* $ PPP = Purchasing Power Parity. Source: https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm

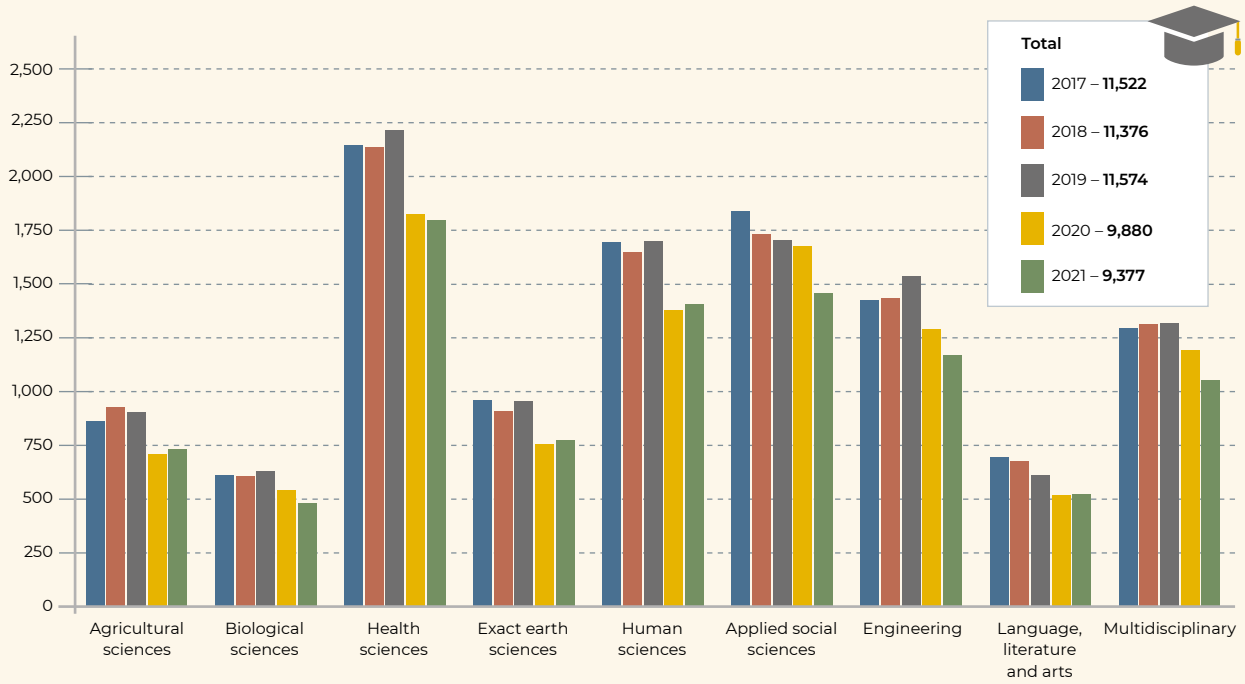
TRAINING OF HUMAN RESOURCES

PhDs awarded, by knowledge area – 2017-2021



TRAINING OF HUMAN RESOURCES

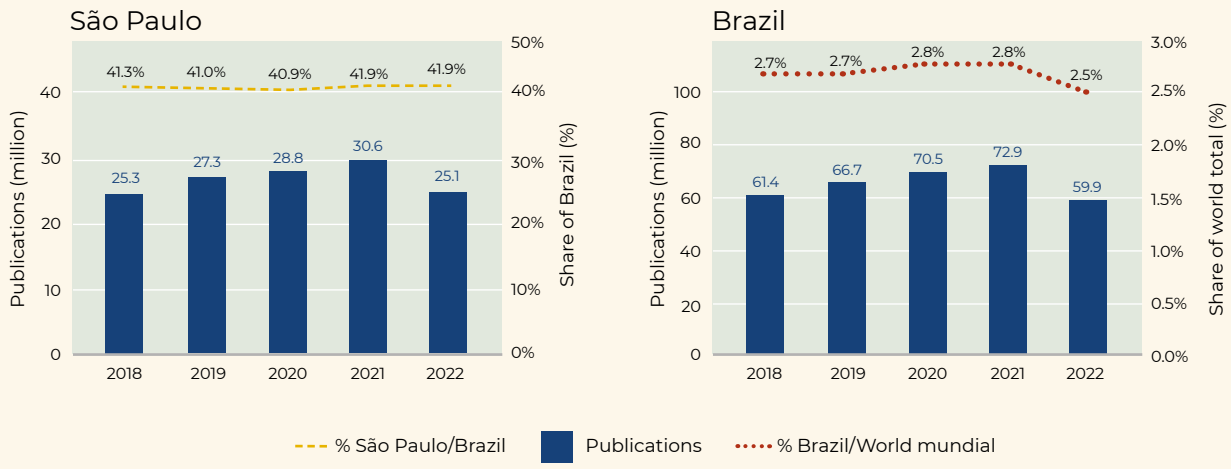
Master awarded, by knowledge area – 2017-2021



Source: CAPES – Sucupira Platform (student database). Chart by FAPESP/GEI.

SCIENTIFIC PUBLICATIONS

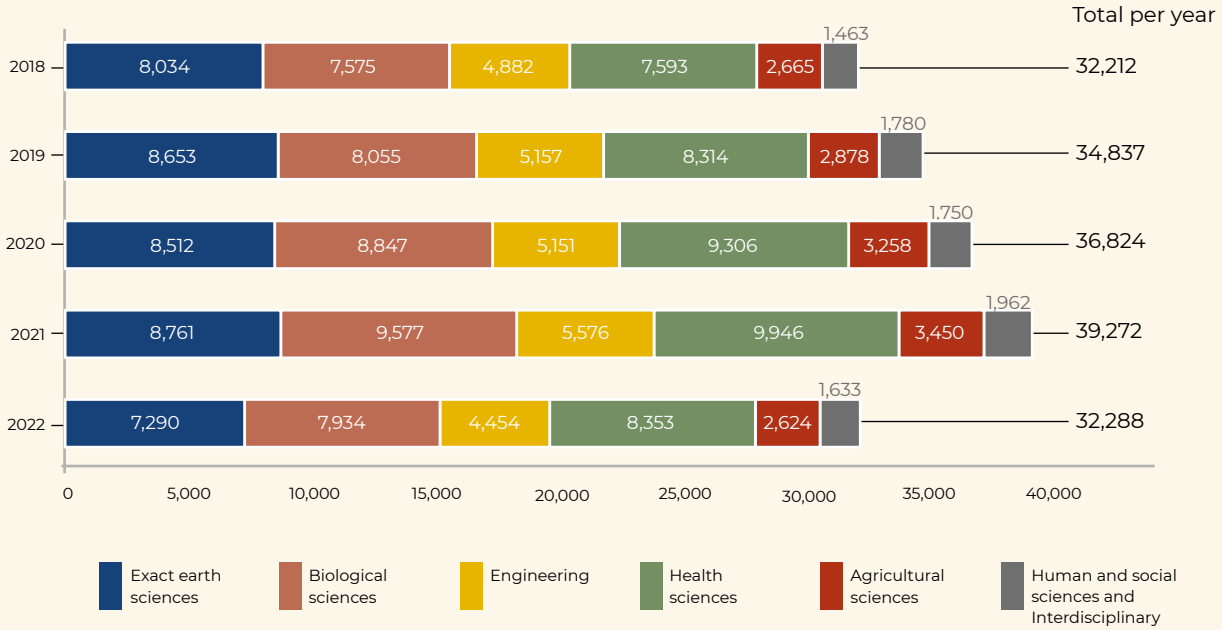
Number of publications – Total (million) and share (%)
São Paulo/Brasil and Brasil/World Total – 2018-2022



Note: one of the factors that contributed to the fall in the number of scientific publications originating in São Paulo and Brazil in 2022 may have been a fall in the number of PhDs awarded during the pandemic, entailing production of fewer theses and scientific articles detected only in 2022.

SCIENTIFIC PUBLICATIONS

Publications by FAPESP knowledge area
São Paulo – 2018-2022



Source: Clarivate (InCites, Web of Science).

Note: publication types are Articles, Proceedings Papers and Reviews as per Web of Science/Clarivate, grouped in accordance with FAPESP's classification of areas. Downloaded on June 3, 2023, via Incites/Clarivate. A publication is assigned to a region if at least one of the authors' addresses is in the region.

FAPESP HIGHLIGHTS 2022

FAPESP's support for scientific and technological development in São Paulo State is oriented by six funding strategies, described below:

TRAINING OF HUMAN RESOURCES FOR S&T

Regular scholarships/fellowships for undergraduate and graduate students in Brazil and abroad, not associated with other research grants. **In Brazil:** Scientific Initiation, Master's, PhD, Direct Doctorate, Postdoc; Mentoring Initiative for Research Career Consolidation; Aristides Pacheco Leão Program to Stimulate Scientific Vocations. **Abroad:** Research Fellowship Abroad (RFA), postdoc level; Research Internship Abroad (RIA) to fund research conducted abroad while a scholarship/fellowship is in progress in Brazil.
Training of Human Resources for S&T: scholarships and fellowhips associated with research projects are accounted for in other strategies.

RESEARCH TO ADVANCE KNOWLEDGE

Long term: support for basic and applied research via Thematic Projects, RIDC, SPEC and YI programs, Project Generation, Special Projects, Initial Π (Pi) Project Research Grants, and associated research grants/scholarships. **Short term:** support for basic and applied research via Regular Research Grants and associated scholarships/ fellowships, and regular grant modalities: visiting researchers from abroad, scientific publications, and participation in or organization of scientific or technological meetings.

RESEARCH FOR INNOVATION

A set of research programs that prioritize collaboration between business organizations and universities or research institutions and stimulate technological innovation in São Paulo State.
Programs: Research Partnership for Technological Innovation (PITE); Engineering Research Centers/Applied Research Centers (ERCs/ARCs); ARCs in Artificial Intelligence in partnership with the Ministry for Science, Technology and Innovation (MCTI); Innovative Research in Small Business (PIPE); Support for Intellectual Property (PAPI); associated research grants and scholarships/fellowships.

RESEARCH ON STRATEGIC THEMES

A set of programs whereby FAPESP stimulates the formation of research groups to focus on topics considered strategic to the development of São Paulo State and Brazil, including support for the modernization of research institutions in the state.
Programs: BIOTA-FAPESP (biodiversity); BIOEN (bioenergy); Science for Development Centers (SDCs); Global Climate Change (RPGCC); eScience and Data Science; Public Policy (PPP); Public Education (EP); Plan for Institutional Development of State Research Institutions (PDIP); associated grants and scholarships/ fellowships.

SUPPORT FOR RESEARCH INFRASTRUCTURE

A set of programs whereby FAPESP assures the infrastructure required for the continuity of research.
Programs: Multi-User Equipment; FAP-Livros (Books), Equipment Repair, Institutional Overhead, Access to REDNESP (formerly Rede ANSP), Support for Infrastructure (collections, laboratories etc)..

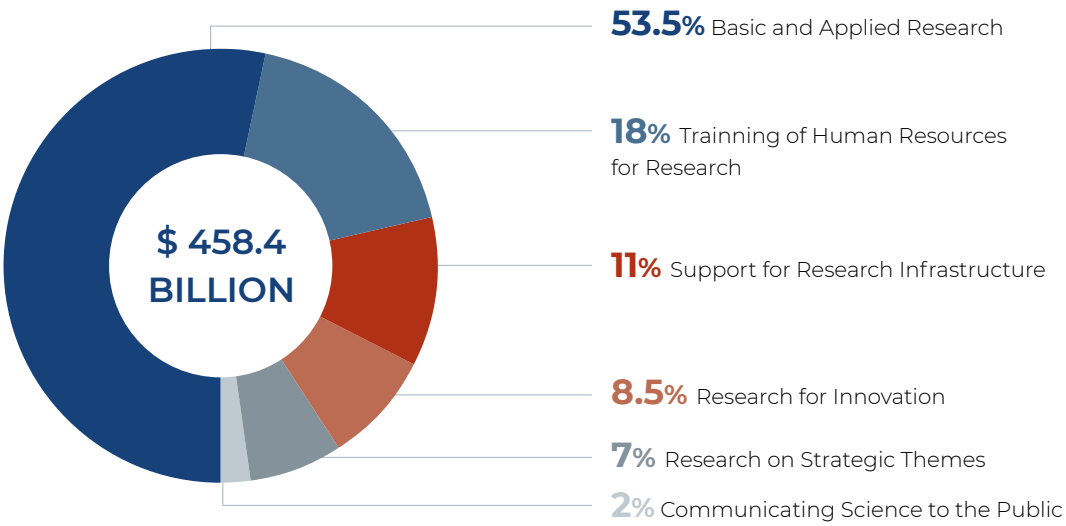
DIFFUSION OF SCIENTIFIC KNOWLEDGE, MAPPING OF RESEARCH UNITS AND STUDIES OF THE GENERAL CONDITION OF RESEARCH IN SÃO PAULO STATE

Initiatives to inform FAPESP's stakeholders about its science policy guidelines and the results and societal and economic impacts of the scientific knowledge produced in São Paulo State with FAPESP's support; and actions to measure the results of its activities, map research institutions and evaluate the overall status of research in the state.

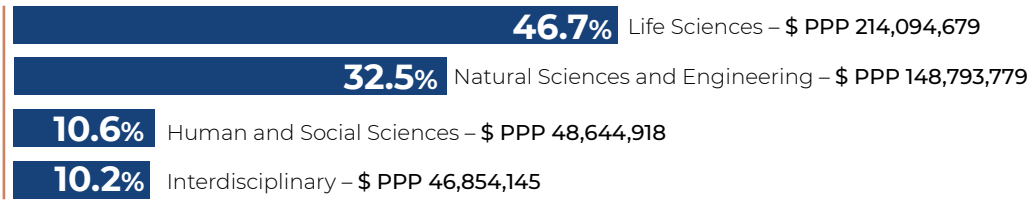
DISBURSEMENT

FAPESP disbursement **$ PPP 458,387,521** to fund **20,709** active research projects.

BY FUNDING STRATEGIES



BY MAJOR KNOWLEDGE AREA



PROJECTS SUBMITTED, PROJECT APPROVED, PROPOSAL SELECTION

In 2022,the number of projects submitted to FAPESP totaled **16,902** and **8,720** were selected. The number of active projects plus new projects selected during the year amounted to **20,709**.

Advisors to the Science Directorate and **8,483** ad hoc reviewers issued **23,606** expert opinions. The average time taken to analyze each of **14,491** initial evaluation was **86** days.

60 years: FAPESP completed 60 years with an official ceremony at its head offices (on May 25, 2022) and a concert at Sala São Paulo (on May 30). Workshops and commemorative events were held between May 2021 and 2022, including seventeen FAPESP 60 Years Lectures, and publications were launched (*p. 39*).

GENOME 20+2: the twenty-second anniversary of the FAPESP Genome Project and the whole-genome sequencing of the bacterium *Xylella fastidiosa* were celebrated with a workshop and an exhibition *(p. 48*).

PASTEUR INSTITUTE IN SÃO PAULO: under the aegis of a partnership between the University of São Paulo (USP), the São Paulo State Government and the French institution, FAPESP renewed and expanded its support for the Pasteur-USP Scientific Platform, a network of laboratories that will include Pasteur Institute's Brazilian unit.

ARISTIDES PACHECO LEÃO PROGRAM TO STIMULATE SCIENTIFIC VOCATIONS: an agreement between the Brazilian Academy of Sciences (ABC) and FAPESP, signed in 2022 for a five-year period and renewable for another five years, offers summer internships for 50 undergraduates at laboratories led by titular members of ABC. (*p. 74*).

PROJECT GENERATION: support for promising early-career researchers to valorize bold ideas and offer special medium-term funding conditions, as well as a Generation Scholarship for the Principal Investigator, who must be exclusively dedicated to conducting the project. The first call, issued in 2022, offered support for research based on bold ideas by researchers who graduated less than 11 years ago, earned a PhD less than six years prior to the deadline for submitting proposals, and were not employed on the contracting date.

YOUNG INVESTIGATOR SCHOLARSHIPS: FAPESP extended the maximum duration of YI scholarships from 48 to 60 months. The measure was part of several aimed at attracting new generations of scientists and stimulating submission of more robust research proposals. The new rule will be valid for new YI scholarship applications submitted to FAPESP as well as existing scholarships and applications currently being processed.

Photo: Léo Ramos Chaves

SUPPORT FOR YOUNG SCIENTISTS: FAPESP and Serrapilheira Institute announced the first Call for Young Investigators in Emerging Centers, issued under the aegis of their cooperation agreement. The opportunity corresponds to the sixth Serrapilheira Call to Support Young Scientists, which in the 2022 edition involves partnerships with the National Council of State Research Foundations (CONFAP) and the state research foundations for São Paulo (FAPESP), Rio de Janeiro (FAPERJ) and Santa Catarina (FAPESC).

RESEARCHERS AT RISK INITIATIVE: launched in 2022, this call for proposals enabled research institutions in São Paulo State to welcome researchers from countries where their activities were at risk, offering grants for visiting researchers and postdoc fellowships under a fast-track allocation totaling $ PPP 7.8 million. Proposals were analyzed according to a special emergency procedure lasting only a few days.

INITIAL Π (PI) PROJECT RESEARCH GRANTS: 111 projects were selected in the first call. This modality was created in 2021 to support projects based on bold ideas in all knowledge areas for a five-year period. Projects were to have a budget of up to $ PPP 387,600 and to be integrated with education and supervision initiatives for undergraduate and graduate students.

SÃO PAULO SCHOOLS OF ADVANCED SCIENCE (SPSAS): FAPESP issued the sixteenth SPSAS call after two years without calls owing to the public health restrictions imposed during the COVID-19 pandemic.

RAISES: FAPESP raised monthly maintenance allowances for visiting researchers by about 20% and scholarships in Brazil by 15%, after four years without any raises.

PIPE SIMPLIFIED: FAPESP launched a pilot initiative to simplify submission of research plans for Phase 1 of the Innovative Research in Small Business Program (PIPE). Proposals in the new format are to have up to 22 pages including résumés for the researchers and consultants to be subcontracted, not including bibliographies.

NEW INTELLECTUAL PROPERTY POLICY FOR PIPE: new rules established that companies supported by PIPE continue to hold exclusive legal IP rights to the results of funded projects. They are not required to share them with FAPESP but must keep it informed about protection for IP rights for tracking purposes.

PIPE FAPESP-SEBRAE-SP CALL – FROM RESEARCH TO THE MARKET: eight projects were selected in the second call for proposals under the agreement signed in 2021 between FAPESP and SEBRAE, the Brazilian Small Business Support Service, to fund PIPE Phase 2 research projects (direct funding).

PIPE-SABESP CALL: FAPESP and SABESP, the São Paulo State Basic Sanitation Corporation, issued a call for proposals, the fourth in the history of their relationship and the first joint call for PIPE proposals.

PIPE-PAPPE GRANT PROGRAM: Twelve projects were selected in the ninth round of the program, announced in 2021, and seven in the tenth round, announced in 2022.

PIPE-TC CALL: FAPESP issued a PIPE for Knowledge Transfer (TC) call to support scientific or technological research projects implemented by small enterprises in partnership with researchers at universities and research institutions, in this case regarding topics of interest to BIOTA-FAPESP (biodiversity), BIOEN (bioenergy) and RPGCC (global climate change).

SPARK PROGRAM (*PROGRAMA CENTELHA*): São Paulo State, through FAPESP, participated in the second edition of Spark (*Centelha*), a national program to support innovative entrepreneurs and disseminate entrepreneurial culture among young people. The program is an initiative of MCTI and the Brazilian Innovation Agency (FINEP), implemented in 26 states in partnership with CONFAP and CERTI Foundation. The call received 571 submissions involving innovative ideas. Fifty were selected at the end of the process in 2022. FAPESP and FINEP allocated $ PPP 31,000 to fund these projects, which will also be eligible for more funding from FAPESP via PIPE.

FINEP – TECNOVA II: FAPESP announced the selection of three projects in the second round of the program, which supports the development of innovative products and processes that strengthen economic sectors considered strategic by federal government policies and that comply with innovation policy in São Paulo State.

PITE: The rules for use of funds by beneficiaries of PITE were changed in December 2022, enabling research institutions' personnel costs to be covered by partner companies. The purpose of the change was to remove limitations on payment of salaries to project teams and make budget allocations more flexible.

BIOTA: A call entitled Discoveries and Collections was issued as part of BIOTA's initiatives for 2023, in accordance with the program's strategic plan for the next eight years.

PARTNERSHIPS WITH THE STATE GOVERNMENT: : BIOTA issued the second call under a cooperation agreement signed with the São Paulo State Department of Infrastructure and Environment (SIMA) and the São Paulo State Forest Conservation and Production Foundation (*Fundação Florestal, FF*). The purpose of the agreement is to assist management of the state's conservation units, focusing on the Jureia-Itatins Ecological Station. BIOEN announced that four projects had been selected in its joint call with SIMA to support research on bioenergy generation from solid and liquid agroindustrial and urban waste.

LONG-DISTANCE TRANSPORTATION: BIOEN will select bioenergy research projects that contribute to efficient long-distance transportation solutions, in partnership with the IEA Bioenergy Technology Collaboration Program, an initiative of the International Energy Agency. FAPESP's financial support for the projects selected in this call will total $ PPP 7.8 million.

CLIMATE CHANGE: RPGCC allocated $ PPP 3.9 million to projects focusing on land-use change and agriculture. The twin aims were to help develop solutions that reduce deforestation and forest degradation in all biomes, thereby reducing carbon emissions in the land-use change sector, and to support food supply chain strategies that raise crop yields and contribute to food and nutritional security in the context of climate change.

ACCELERATING THE ENERGY TRANSITION IN SÃO PAULO AND BRAZIL: RPGCC allocated $ PPP 3.9 million to projects that provide analysis and future visions for a faster energy transition, especially considering technological innovation in energy production and use (electricity and fuels), physical, institutional and regulatory infrastructure, and biodiversity conservation, among others.

NEW SCIENCE FOR DEVELOPMENT CENTERS (SDCS): Twenty-eight SDCs were selected in two calls (2019 and 2021): 17 were announced in 2022.

eSCIENCE: a new call was issued by this program, which reserved $ PPP 8.1 million to support collaborative projects conducted by researchers in computer sciences and human and social sciences.

BASIC EDUCATION: FAPESP and the São Paulo State Department of Education (SEDUC) issued the first of three calls for proposals under the Proeduca program to support research relating to basic education. The program aims to support public policies and innovative pedagogical approaches that facilitate learning and reduce educational inequalities. Investment in the projects selected in this first call will total $ PPP 11.6 million, with FAPESP allocating $ PPP 7.8 million and SEDUC investing $ PPP 3.9 million.

MULTIUSER EQUIPMENT: Three new calls were issued for purchases of multiuser equipment with the aim of expanding the capacity of São Paulo's instrument base, emphasizing techniques and equipment not yet available to research institutions in the state. Large items not affordable via other funding lines will be prioritized.

SP BACKBONE: A high-speed fiber optic network enabling universities to share scientific data and educational material with each other and with institutions abroad, as well as achieving high-performance co-processing, the São Paulo (SP) backbone will be operated by the Research and Education Network (REDNESP, formerly Rede ANSP), supported by FAPESP, and interconnect the state's eight universities at a data rate of 100 Gigabits per second (Gbps).

AMAZÔNIA +10: More than 500 researchers in 20 Brazilian states responded to the first call for proposals, issued in June 2022. The number of submissions was 97 and 39 were selected, for investment totaling $ PPP 16.2 million (*p. 152*).

RESEARCH COOPERATION

In 2022, FAPESP held **38 joint calls** with **19** foreign organizations and **13** domestic organizations (funding agencies, universities, associations, multilateral bodies and companies).

FAPESP signed **7** new research co-funding agreements: **215 active partnerships** with **162** foreign organizations and **53** domestics organizations.

SCIENCE DIFFUSION

53,008 references by media outlets to research projects funded by FAPESP

9,792 news stories carried by media outlets in **107** countries

43,216 news stories carried by **6,318** Brazilian media outlets

Growth of **3%** in the number of mentions of FAPESP compared with 2021

EXAMPLES OF RESEARCH PROJECTS FUNDED IN 2022

BRAZILIAN MODEL VACCINATION PROGRAM REDUCED SEVERE CASES OF COVID-19 AND DEATHS EVEN FROM VARIANTS

A study conducted in Serrana, a small town in São Paulo State used as a model for COVID-19 vaccination in Brazil, showed that mass vaccination reduced the severe case and death rates even while the gamma and delta variants were circulating. Gamma and delta were considered alarming because they spread so much faster than previous variants. The study was part of Project S, the first ever clinical trial of vaccine effectiveness conducted in Serrana by Butantan Institute, the Ribeirão Preto Blood Center and the Center for Cell-Based Therapy (CTC). The article "Dynamics of SARS-CoV-2 variants of concern in vaccination model city in the State of São Paulo, Brazil" was published in the scientific journal *Viruses*: www.mdpi.com/1999-4915/14/10/2148/htm.

Photo: Butantan Institute

STUDY OPENS UP NEW POSSIBILITIES FOR TREATMENT OF PITT-HOPKINS SYNDROME

See page 92

A group led by Brazilian scientists at the State University of Campinas's Institute of Biology (IB-UNICAMP) in São Paulo and the University of California San Diego (UCSD) in the United States discovered the mechanism that causes Pitt-Hopkins syndrome (PTHS), a neuropsychiatric disorder with autism spectrum disorder characteristics. The researchers also succeeded in reversing progression of the syndrome in laboratory models, opening up new possibilities for treatment. The article "Transcription factor 4 loss-of-function is associated with deficits in progenitor proliferation and cortical neuron content" was published in *Nature Communications*: www.nature.com/articles/s41467-022-29942-w.

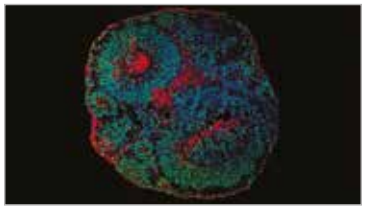


Image: Fábio Papes/UNICAMP

EXAMPLES OF RESEARCH PROJECTS FUNDED IN 2022

EDIBLE, BIODEGRADABLE, ANTI-MICROBIAL PLASTIC BOASTS HIGHER TENSILE STRENGTH THAN PETROLEUM-BASED PLASTIC

See page 84

A material produced by researchers at São Paulo State University's Ilha Solteira School of Engineering (FEIS-UNESP) was an important contribution to the production of "bioplastic" or "green plastic". They made the material from type B bovine gelatin easily found in retail stores in the form of a colorless powder, with the addition of clay and a nanoemulsion derived from black pepper essential oil. It will help reduce the use of fossil fuels to produce plastic and contribute to the development of biodegradable packaging. The article "Performance of gelatin films reinforced with cloisite Na+ and black pepper essential oil loaded nanoemulsion", co-authored by scientists affiliated with the Center for Development of Functional Materials (CDFM), was published in *Polymers*: www.mdpi.com/2073-4360/13/24/4298.

Photos: Preparing the mixture and finished product. Credit: researcher's archive

COVID-19 VACCINE DEVELOPED BY BRAZILIAN SCIENTISTS BEGINS CLINICAL TRIALS

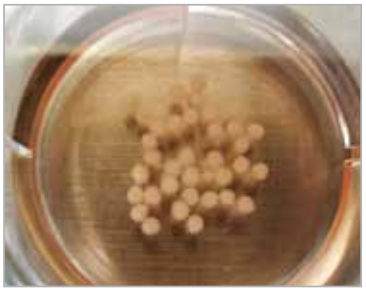
Testing on humans of SpiN-Tec, a COVID-19 vaccine developed entirely with indigenous technology and inputs, began in November 2022 at the Federal University of Minas Gerais's Medical School (FM-UFMG) in Belo Horizonte. The vaccine was developed by the university's Vaccine Technology Center (CTV-UFMG) in partnership with Oswaldo Cruz Foundation (Fiocruz). It was funded by the Ministry for Science, Technology and Innovation (MTCI), the Brazilian Innovation Agency (FINEP) and the National Council for Scientific and Technological Development (CNPq) for preclinical and Phase 1 and 2 clinical trials, and by FAPESP for preclinical trials, confirming its efficacy and safety. It performed well in animal trials, as reported in an article published in *Nature Communication*: www.nature.com/articles/s41467-022-32547-y.

SpiN-Tec

MODEL THAT MIMICS MALFORMATION ASSOCIATED WITH SEVERE EPILEPSY PAVES WAY TO NOVEL THERAPIES

See page 85

In partnership with a group at the University of California San Diego (UCSD) in the United States, researchers at the State University of Campinas's Medical School (FCM-UNICAMP) and affiliated with the Brazilian Institute of Neuroscience and Neurotechnology (BRAINN) created the first brain organoids cultured from patients' cells to mimic focal cortical dysplasia, a malformation of the cerebral cortex associated with one of the most severe types of epilepsy. They also identified mechanisms that may be involved in the emergence of the anomaly during brain formation and obtained electrical readouts resembling the neuronal discharge typical of epileptic seizures in humans. The results were reported in *Brain*, a leading neuroscience journal published by Oxford Academic. The article is entitled "Junctional instability in neuroepithelium and network hyperexcitability in a focal cortical dysplasia human model" https://academic.oup.com/brain/article/145/6/1962/6484506?login=false.



Researchers reprogrammed skin cells from patients with the disease. Photo: Simoni Avansini/UNICAMP

EXAMPLES OF RESEARCH PROJECTS FUNDED IN 2022

REDUCING CHILDHOOD POVERTY COULD CUT CRIMINAL CONVICTIONS BY ALMOST A QUARTER, STUDY SHOWS

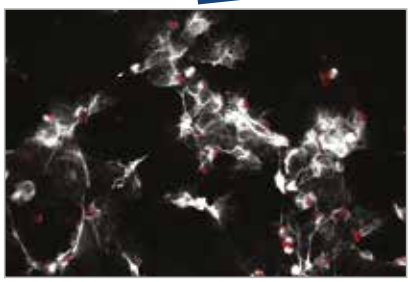
See page 80

Researchers affiliated with the National Institute of Developmental Psychiatry, one of the national science and technology institutes (NICTs) supported by FAPESP and the National Council for Scientific and Technological Development (CNPq), followed 1,905 children for seven years and analyzed 22 risk factors that affect human development. An article on the study, entitled "Childhood individual and family modifiable risk factors for criminal conviction: a 7-year cohort study from Brazil", was published in *Scientific Reports*: www.nature.com/articles/s41598-022-13975-8#Sec3.

STUDY PRESENTS NOVEL THERAPEUTIC TARGET FOR TREATMENT OF SEPSIS

See page 85

Researchers at the University of São Paulo's Ribeirão Preto Medical School (FMRP-USP) and affiliated with the Center for Research on Inflammatory Diseases (CRID), funded by FAPESP, found that a protein called gasdermin D is involved in septic patients' tissue lesions. They also showed that its action can be inhibited and complications of sepsis prevented by a drug originally indicated to combat alcohol dependence. An article entitled "Gasdermin D inhibition prevents multiple organ dysfunction during sepsis by blocking NET formation" was published in the journal *Blood*: ashpublications.org/blood/article-abstract/138/25/2702/476604/Gasdermin-D-inhibition-prevents-multiple-organ?redirectedFrom=fulltext.



Microscope image showing NETs (white) and gasdermin D (red). Credit: CRID/USP

SCIENTIFIC STUDY LINKS ALCOHOL AND DRUG ABUSE IN 31% OF TRAUMA HOSPITALIZATIONS

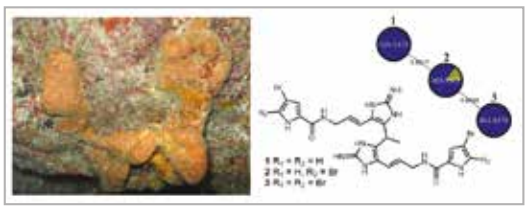
See page 92

In a study conducted by researchers at the University of São Paulo's Medical School (FM-USP), 31.4% of trauma patients tested at Hospital das Clínicas, Latin America's largest hospital complex, had consumed psychoactive substances. Alcohol was used by 23%, cocaine by 12%, and marijuana by 5%. Traces of more than one drug were detected in 9% of the blood samples. Researchers at Norway's Oslo University Hospital collaborated in the study. The results were reported in the article "Use of alcohol and illicit drugs by trauma patients in São Paulo, Brazil", published in the journal *Injury*: www.sciencedirect.com/science/article/pii/S0020138321009049?dgcid=author.

NOVEL COMPOUNDS DISCOVERED IN MARINE SPONGE CAN KILL DRUG-RESISTANT BACTERIA

See page 112

A research group led by scientists at the University of São Paulo's São Carlos Institute of Chemistry (IQSC-USP) identified a number of bioactive compounds in a marine sponge collected on Fernando de Noronha, an archipelago about 400 km off the coast of Brazil's Northeast region. Some of the substances proved capable of killing bacteria that are resistant to currently available antibiotics, paving the way to development of new drugs. An article on the study, entitled "Feature-based molecular networking discovery of bromopyrrole alkaloids from the marine sponge Agelas dispar", was published in the *Journal of Natural Products*: pubs.acs.org/doi/10.1021/acs.jnatprod.2c00094.



Marine sponge containing novel substances found to kill antibiotic-resistant bacteria.
Image: *Journal of Natural Products*

EXAMPLES OF RESEARCH PROJECTS FUNDED IN 2022

EXTANT SPECIES OF ATTA LEAF-CUTTING ANTS MAY HAVE BENEFITED FROM EXPANSION OF THE CERRADO

See page 112

A study conducted by researchers at the State University of Campinas's Institute of Biosciences (IB-UNICAMP) in collaboration with colleagues in Argentina and the United States suggests that the Cerrado, Brazil's Neotropical savanna biome, may have been a center for the emergence of new species of Atta leaf-cutting ants between 1 million and 3 million years ago, when the biome was expanding. However, the recent spread of agriculture in the region appears to be having a negative effect on species diversity among Atta there, favoring species considered agricultural pests. An article on the study, entitled "Phylogenomic reconstruction reveals new insights into the evolution and biogeography of Atta leaf-cutting ants (Hymenoptera: Formicidae)", was published in the journal *Systematic Entomology*: onlinelibrary.wiley.com/doi/10.1111/syen.12513.

Photo: Wikimedia Commons

BRAZIL'S NORTHEAST REGION PROBABLY DRIED UP DURING EARTH'S LAST MINIMUM AXIAL TILT THOUSANDS OF YEARS AGO

See page 113

According to an article in *Quaternary Science Reviews*, tree density in the Cerrado has been controlled mainly by the length of the dry season in the past 45,000 years. The article resulted from two projects conducted at the University of São Paulo's School of Arts, Sciences and Humanities (EACH-USP). An understanding of how ecosystems adapted to past changes can provide a long-term perspective on the magnitude of the ongoing ecological changes, and of their spatial and temporal aspects. The article "Changes in obliquity drive tree cover shifts in eastern tropical South America" is at: www.sciencedirect.com/science/article/pii/S0277379122000336?dgcid=coauthor.

AGGRESSIVENESS OF PET DOGS IS INFLUENCED BY LIFE HISTORY AND OWNER'S CHARACTERISTICS, STUDY SUGGESTS

Dogs walked every day by their owners are less aggressive. Dogs owned by women bark less at strangers. Heavier dogs tend to be less disobedient than lighter pets. Pugs, Bulldogs, Shih Tzus and other short-snouted breeds may be more badly behaved than medium- and long-snouted dogs, such as Golden Retrievers or the caramel-colored mixed-breed dogs popular in Brazil. These are some of the findings of a study conducted by researchers at the University of São Paulo (USP) in Brazil. The study sample comprised 665 pet dogs of different breeds as well as mongrels. The article "Relationships among morphological, environmental, social factors and aggressive profiles in Brazilian pet dogs" was published in the journal *Applied Animal Behaviour Science*: www.sciencedirect.com/science/article/abs/pii/S0168159122002246?via=ihub#gs2.

Photo: Freepik

CELL PROGRAMMING TECHNIQUE OFFERS FASTER AND CHEAPER CANCER TREATMENT

Researchers at the University of São Paulo's Center for Cell-Based Therapy (CTC-USP) developed a technique for producing chimeric antigen receptor (CAR) T cells faster and more cheaply. CAR T-cell therapy is a recent innovation in cancer treatment. The master's research project "All-in-one virus-free manufacturing process of allogeneic chimeric antigen receptor (CAR) T cells using CRISPR-Cas9" was considered "best in bone marrow transplant and cellular therapy" by the Brazilian Hematology, Hemotherapy and Cell Therapy Conference in 2022. agencia.fapesp.br/39828.

Image: Rita Elena Serda/NCI-NIH

Research projects supported by FAPESP associated with patent filings at Brazil's National Industrial Property Institute (INPI)

SUBSTANCE ANALOGOUS TO CANNABIDIOL CAN ENHANCE CHEMOTHERAPY BY PREVENTING NEUROPATHIC PAIN

In a study involving mice conducted by researchers at the University of São Paulo's Ribeirão Preto Medical School (FMRP-USP), the cannabidiol analog PECS-101 prevented the neuropathic pain caused by chemotherapy and improved cancer treatment with no adverse effects. The group affiliated with the Center for Research on Inflammatory Diseases (CRID), a Research, Innovation and Dissemination Center (RIDC) funded by FAPESP, owns an international patent on PECS-101. Described in the journal *Neurotherapeutics*, the study also showed that, like cannabidiol, PECS-101 does not cause dependence (agencia.fapesp.br/38001).

Photo: Wikimedia Commons

TOLL TAG TECHNOLOGY IS REPURPOSED FOR USE IN WILDLIFE MONITORING

A system developed by Trapa-Câmera, a startup supported by PIPE-FAPESP, can be used by biologists in scientific research, by NGOs to track endangered species, and by environmental consultants. Based on similar technology to the windscreen tags that let drivers pay road tolls and parking fees remotely, the novel telemetry system will offer a handy alternative for monitoring wild animals. Despite the firm's innovative application of the technology, the new product cannot be patented according to Brazilian law, but the tool can be protected as a utility model (agencia.fapesp.br/39478).

3D PRINTER RESIN DEVELOPED AT UNICAMP PERMITS PRODUCTION OF SELF-DEGRADING IMPLANTABLE DEVICE

Researchers at the State University of Campinas's Institute of Chemistry (IQ-UNICAMP) developed a method of producing implantable medical devices based on a 3D printer resin that is photocurable (solidifying when exposed to light) and triggers the release of nitric oxide (NO), a vasodilatory substance. The devices self-degrade after a certain time. A patent application was filed in Brazil by Inova UNICAMP (agencia.fapesp.br/37920).

TECHNOLOGY OPTIMIZES RENEWABLE ENERGY GENERATION FROM MALTING BARLEY BAGASSE BY THE BEER INDUSTRY

A research group at the State University of Campinas (UNICAMP) proposed treating the solid waste produced by breweries with ultrasound before submitting it to the process of digestion by microorganisms. The strategy obtains larger amounts of methane, which can be used by the brewery itself to generate electricity and heat. The final waste can be used as crop fertilizer. The methodology was described in the *Journal of Cleaner Production*. In 2020, the research group led by Tânia Forster-Carneiro patented the use of this organic waste in anaerobic reactors operated by brewers for the purposes of wastewater treatment (agencia.fapesp.br/39093).

BIODEGRADABLE MATERIAL OPTIMIZES APPLICATION OF FERTILIZER TO SEEDLINGS

Researchers at the Federal University of São Carlos (UFSCar) and the University of São Paulo (USP) developed a biodegradable material that releases nutrients slowly for a long time to enhance plant production and growth. The technology saves time and labor, while also reducing the generation of waste. With a substrate of cellulose fiber from sugarcane bagasse, the invention looks like a piece of paper and contains nitrogen, phosphorus and potassium, macronutrients essential to the development of any plant. Its biodegradability derives from natural decomposition in contact with the environment. The method has been patented in Brazil with the support of UFSCar's innovation agency (agencia.fapesp.br/38664).

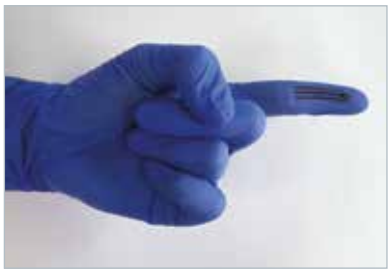


Foto: Nathalia Gomes/USP

SCIENTISTS AT THE UNIVERSITY OF SÃO PAULO CREATE A GLOVE THAT DETECTS PESTICIDES IN FOOD

Scientists at the University of São Paulo (USP) in Brazil created a wearable device to detect pesticide residues in foodstuffs. The device consists of a synthetic rubber glove with sensors in three fingers. A patent application has been filed in Brazil. According to the researchers, the sensors enable fast, reliable and robust analysis in situ and at low cost, whereas the methods in current use to detect pesticides are expensive, require skilled labor, and take a long time to produce results (agencia.fapesp.br/37874).

Imagem: CNPEM/divulgação

A WEARABLE SENSOR FOR REAL-TIME MONITORING OF SOYBEAN AND SUGARCANE HEALTH

A prototype developed at Brazil's National Center for Research in Energy and Materials (CNPEM) quantifies the water inside plant cells from a single measurement, providing data in real time to help farmers manage existing inputs and develop new ones. The main advantages of the device developed at CNPEM are portability, a ten-day battery charge, sensitivity, biocompatibility, and secure data acquisition permitting automation of remote monitoring. No similar sensors are on the market, and a patent application has been filed in Brazil (agencia.fapesp.br/38605).

CHAPTER

1

THE INSTITUTION

- About FAPESP
- Governance
- Proposal selection
- Evaluation of FAPESP's Programs

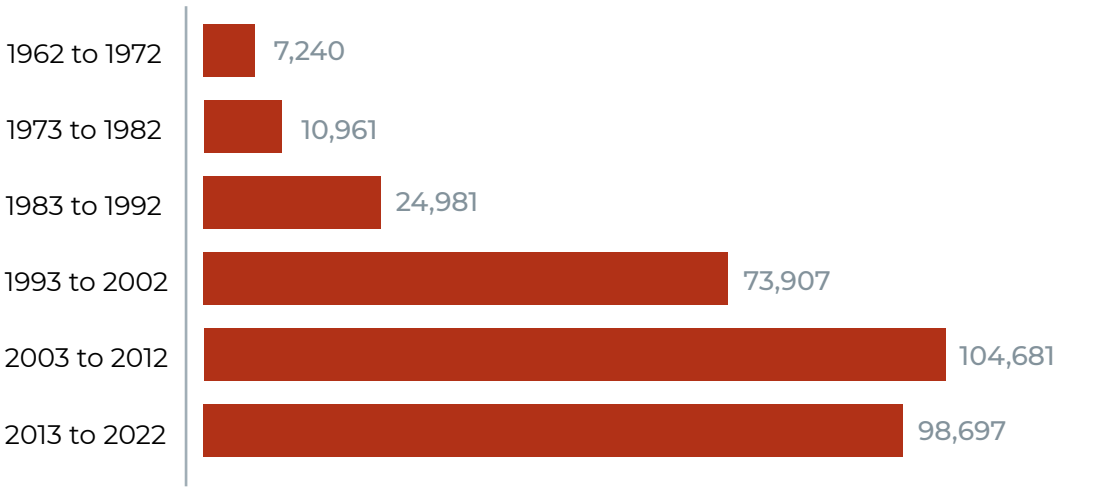
The São Paulo Research Foundation (FAPESP) is one of Brazil's leading public agencies for the funding of research. FAPESP was formally created by State Law 5918 (dated October 18, 1960), which established that its remit was to support scientific research and science dissemination in São Paulo State. It began operating in 1962 in accordance with Decree 40132 (dated May 23, 1962).

Called for by São Paulo State's 1947 Constitution and ratified by its 1989 Constitution, FAPESP receives 1% of the state's annual tax revenue to carry out its mission of investing in scientific and technological development.

This investment takes the form of scholarships, fellowships and grants to fund research projects in all knowledge areas led by researchers affiliated with public or private higher education and research institutions in São Paulo State, and by researchers employed by companies based in the state.

FAPESP's funding strategies support Research for Innovation, Research for Knowledge Advancement, Research on Strategic Themes, Training of Human Resources for Science and Technology, Support for Research Infrastructure, and Knowledge Diffusion initiatives.

CHART 1 NUMBER OF PROJECTS SUPPORTED – 1962 TO 2022



GOVERNANCE

FAPESP is governed by a Board of Trustees and an Executive Board. The São Paulo State Constitution guarantees its administrative autonomy. The Board of Trustees sets general guidelines and makes key decisions regarding scientific policy, administrative affairs and asset management.

The Board has 12 members, who each serve a six-year term renewable once. Six trustees are appointed directly by the state governor, and the others are chosen by the governor from three-name shortlists submitted by public and private higher education and research institutions in São Paulo State. FAPESP's president and vice president are appointed by the governor from a three-name shortlist drawn up by the Board of Trustees from among its own members.

The Executive Board (CTA) is responsible for the day-to-day running of FAPESP. It has three members: the Executive Director, the Scientific Director, and the Administrative Director. They are chosen by the governor from three-name shortlists drawn up by the Board of Trustees and are retained by FAPESP for up to three years, renewable for two further terms.

DECEMBER 2022

PRESIDENT	Marco Antonio Zago
VICE PRESIDENT	Ronaldo Aloise Pilli
BOARD OF TRUSTEES	Carmino Antonio de Souza *(since Dec 21st 2022)*
	David Everson Uip *(Jul 20th to Dec 20th 2022)*
	Dimas Tadeu Covas *(until Mar 31st 2022)*
	Helena Bonciani Nader
	Hernan Jacobus Cornelis Voorwald *(since Aug 18th 2022)*
	Ignácio Maria Poveda Velasco
	Liedi Legi Bariani Bernucci
	Marco Antonio Zago
	Mayana Zatz
	Mozart Neves Ramos
	Pedro Luiz Barreiros Passos
	Pedro Wongtschowski
	Ronaldo Aloise Pilli
	Thelma Krug
	Vanderlan da Silva Bolzani *(until Aug 17th 2022)*
EXECUTIVE BOARD	Carlos Américo Pacheco, *Executive director*
	Luiz Eugênio Mello, *Scientific director*
	Fernando Menezes de Almeida, *Administrative director*

PROPOSAL SELECTION

Research proposals submitted to FAPESP for support from its various funding lines are evaluated by peer review. Committees of experts called Area Panels coordinate the proposal assessment process in major knowledge areas under the aegis of FAPESP's Scientific Directorate.

The relevant Area Panel selects ad hoc reviewers to analyze each proposal and issue a merit assessment. The proposal then returns to the Area Panel, which issues an approval or denial recommendation to the Scientific Directorate. The Scientific Directorate makes the final decision, with the assistance of a supervisory panel comprising 20 associate coordinators. Decisions must be ratified by the Executive Board, and may also have to be endorsed by the Board of Trustees.

TABLE 1

AD HOC REVIEWERS AND ASSESSMENTS

Evolution – 2017 to 2022

Nº of assessments by reviewers	Nº of reviewers by year					
	2017	2018	2019	2020	2021	2022
1 to 4	7,797	7,821	8,016	8,272	7,797	6,962
5 to 9	1,051	1,103	1,184	1,194	1,087	1,321
10 to 14	64	75	71	120	126	181
15 or +	8	4	8	13	11	19
Total of reviewers	**8,920**	**9,003**	**9,279**	**9,599**	**9,021**	**8,483**

CHART 2

NUMBER OF ASSESSMENTS BY REVIEWERS' REGIONS OF ORIGIN – 2017 TO 2022

NORTH

2017	2018	2019	2020	2021	2022
34	12	15	22	19	22

NORTHEAST

2017	2018	2019	2020	2021	2022
325	304	293	315	275	309

CENTER-WEST

2017	2018	2019	2020	2021	2022
255	221	228	244	228	231

SOUTHEAST

	2017	2018	2019	2020	2021	2022
São Paulo	19,570	19,724	20,762	21,719	19,433	21,093
other states	1,276	1,141	1,125	1,172	1,034	1,076

SOUTH

2017	2018	2019	2020	2021	2022
617	592	598	618	508	519

NOT IDENTIFIED

2017	2018	2019	2020	2021	2022
180	149	149	132	819	356

FOR MORE DETAILS OF FAPESP'S PROJECT SELECTION PROCESS, SEE http://fapesp.br/pdf/peer_review.pdf. THE STEPS IN THIS PROCESS ARE SUMMARIZED BELOW:

STEP 1

Area Panels receive applications

Each application received by FAPESP goes to the Area Panel corresponding to the knowledge area for the project. The Area Panel analyzes the abstract and the principal investigator's institutional affiliation.

STEP 2

Selection of ad hoc reviewers and issuance of assessment reports

The Area Panels select specialists with specific competencies in each project's subject matter to act as ad hoc reviewers, asking them to analyze proposals and issue expert opinions on their merit. The choice of ad hoc reviewers avoids potential conflicts of interest. The FAPESP recently implemented a program based on algorithms and integrated into the Management Support System (SAGE) to analyze data from FAPESP's processes (reviewer history, project research area, keywords, conflicts) and suggest lists of possible reviewers for each new proposal. These lists are presented to the Area Panels, which make the final selection based on the recommendations.

8,483 ad hoc reviewers produced 23,606 assessments in 2022

STEP 3

Analysis by Area Panel

The proposal returns to the Area Panel, which analyzes the reviewers' assessments and recommends approval or denial by the Scientific Directorate.

KNOWLEDGE AREAS OF PROPOSALS ANALYZED IN 2022:

- 50.5% Life Sciences
- 27.3% Natural Sciences and Engineering
- 21.2% Human and Social Sciences
- 1.0% Interdisciplinary

STEP 4

Analysis by Supervisory Panel

The Scientific Directorate also works with a Supervisory Panel comprising 20 researchers who are Area Panel members and recognized leaders in their respective fields. They review the recommendations made by the Area Panels to assure compatibility with the available merit assessments. They may endorse recommendations, or question them and suggest further analysis, among other measures.

STEP 5

Decision by Scientific Directorate

The Scientific Directorate's decisions are based on the recommendations of the Supervisory Panel and Area Panels.

86 days was the average time taken to analyse each of the 14,491 initial assessments

STEP 6

Approval by Executive Board

The Executive Board (CTA) **deliberates** on the applications for research funding, subject to ratification by the Board of Trustees.

STEP 7

Board of Trustees

The Board of Trustees **examine** the Executive Board's approvals, **ratifying** them if appropriate.

EVALUATION OF FAPESP'S PROGRAMS

FAPESP's programs are regularly evaluated in terms of their scientific, societal and economic impacts. Executive summaries and full reports on the evaluations are available on its portal in Portuguese (**www.fapesp.br/avaliacao**) and in English (**fapesp.br/en/evaluation**). Links to articles deriving from these initiatives and published in special-interest journals can be found on the same pages. The evaluations cover FAPESP's key activities: cross-border cooperation agreements; scientific initiation, master's and PhD scholarships; the Innovative Research in Small Business Program (PIPE), the BIOTA-FAPESP Program, the Multi-User Equipment Program, the Young Investigator Program, the Research Partnership for Technological Innovation Program (PITE), and the Public Policy Program.

FAPESP makes changes to its initiatives in response to these evaluations with the aim of increasing their effectiveness. New activities are also influenced by the evaluations. The process has been enhanced over the years, not least by an exchange of experiences with funding agencies in other countries. The evaluations now involve questionnaires for completion by the researchers and institutions awarded funding, as well as control groups with proponents whose applications for funding are turned down.

FAPESP 60 YEARS 1962 - 2022

SCIENCE, CULTURE AND DEVELOPMENT

In 2022, FAPESP celebrated 60th anniversary of the enactment of Decree 40,132 by São Paulo State Governor Carlos Alberto de Carvalho Pinto. He signed the decree on May 23, 1962, to approve FAPESP's bylaws and authorize it to start operating immediately.

The official ceremony, held on May 25, was attended by prominent members of the scientific community, political leaders, rectors, pro-rectors, heads of research institutions, corporate executives and researchers, among others.

"The creation of a research funding agency in São Paulo State resulted from coordinated actions by scientists, academics, politicians, intellectuals and journalists to promote scientific and technological development in the state," Marco Antonio Zago, President of FAPESP, said in his address to the assembled guests at the commemorative event.

In the 60 years since its inception, FAPESP awarded 180,000 scholarships to support the education and training of new researchers, and 130,000 research grants, almost a third of which were for robust, high-value, long-term projects. It also spearheaded major scientific and technological changes in Brazil, such as implementation of the internet, genomics, and bioinformatics.

Photo: São Paulo State Archives (APESP)

Governor Carlos Alberto de Carvalho Pinto signs Law 5,918 establishing FAPESP at Palácio Campos Elíseos on October 18, 1960. Nineteen months later (on May 23, 1962), he signed Decree 40,132 to approve FAPESP's bylaws and authorize it to start operating immediately.

Image: Phelipe Janning/FAPESP

The ceremony held to commemorate FAPESP's 60th anniversary on May 25, 2022, was attended by Marco Antonio Zago, President of FAPESP; Carlão Pignatari, President of the São Paulo State Assembly (ALESP); Zeina Latif, São Paulo State Secretary for Economic Development; Josué Gomes da Silva, President of the São Paulo State Federation of Industry (FIESP); David Uip, São Paulo State Secretary for Health Science, Research and Development, representing Governor Rodrigo Garcia; Helena Nader, President of the Brazilian Academy of Sciences (ABC); Carlos Américo Pacheco, CEO of FAPESP; rectors, pro-rectors, heads of research institutions, corporate executive, researchers, and other guests.

New investments in research activities totaling $ PPP 383.7 million were announced at the event:

- Three Engineering Research Centers (ERCs)
- 15 Science for Development Centers (SDCs)
- A call for proposals to establish three new Research, Innovation and Dissemination Centers (RIDCs)
- Researchers at Risk
- Project Generation
- Proeduca, in partnership with the São Paulo State Department of Education
- Amazon+10, in partnership with state research funding agencies throughout the Amazon region
- Three new calls for proposals to build or upgrade research infrastructure

"FAPESP's initiatives will increase in the years ahead, thanks to the rapid recovery of São Paulo's economy and the state's rising tax revenue, as well as the decision by FAPESP's Board of Trustees to require highly prudent management of our resources during the pandemic," said Carlos Américo Pacheco, CEO of FAPESP.

Dr. David Uip, an Infectious disease specialist and São Paulo State Secretary for Health Science, Research and Development, represented Governor Rodrigo Garcia at the event and stressed the state government's historical commitment to science, research, innovation and development. The importance of partnering with private enterprise was highlighted by Zeina Latif, São Paulo State Secretary for Economic Development.

The Brazilian scientific community was represented at the ceremony by Helena Nader, President of the Brazilian Academy of Sciences (ABC), who said she considered FAPESP "a great Brazilian institution".

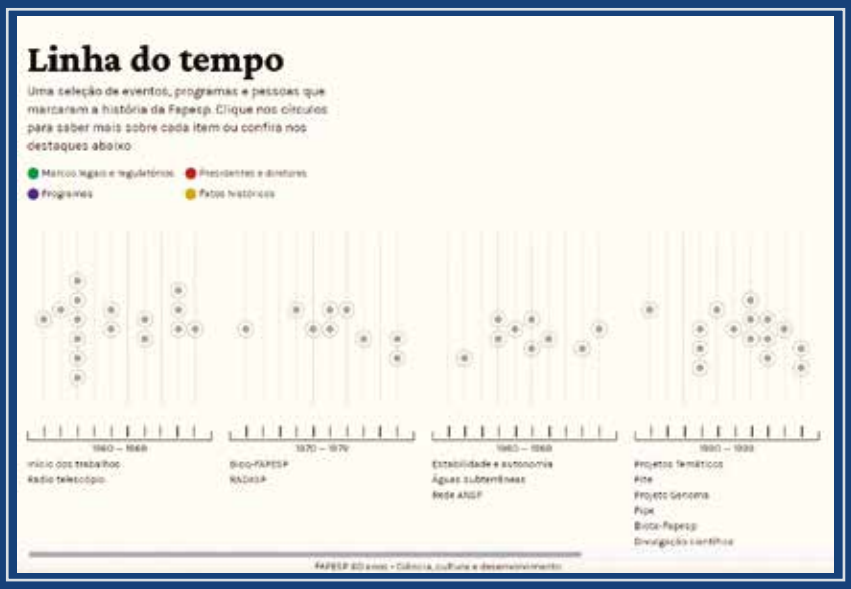
Carlão Pignatari, President of the São Paulo State Assembly (ALESP), spoke of gratitude for the history FAPESP is building for São Paulo. Josué Gomes da Silva, President of the São Paulo State Federation of Industry (FIESP), said the longstanding support given to science and technology by FAPESP and the state government explains why São Paulo leads the national industrial scene.

Also attending the event were Celso Lafer and Carlos Vogt, former Presidents of FAPESP; José Fernando Perez, a former Scientific Director of FAPESP; Evaldo Ferreira Vilela, President of the National Council for Scientific and Technological Development (CNPq); heads of public universities in São Paulo State; directors of research institutions; and researchers.

A recording of the entire event can be watched on *Agência FAPESP*'s YouTube channel.

Commemorations leading up to the anniversary began on May 27, 2021, with the launch of the website "FAPESP and the Sustainable Development Goals", which indexes the portfolio of programs and projects supported by FAPESP to each of the 17 SDGs, with the aim of facilitating access to the research and as a contribution to public policy in the areas concerned. June saw the launch of a series of FAPESP 60 Years Lectures, held monthly and featuring prominent scientists from Brazil and abroad in well-founded reflection on the future via discussions of strategic topics such as climate change, biodiversity, violence and education, among others. Seventeen events in the series were held between June 2021 and December 2022, as well as two FAPESP 60 Years Schools – one in Exact, Natural and Life Sciences, and the other in Humanities, Social Science and the Arts.

All the initiatives associated with the anniversary can be accessed at **60anos.fapesp.br**, which also exhibits biographies of leaders and a timeline with a selection of noteworthy events, programs and personalities in the history of FAPESP.

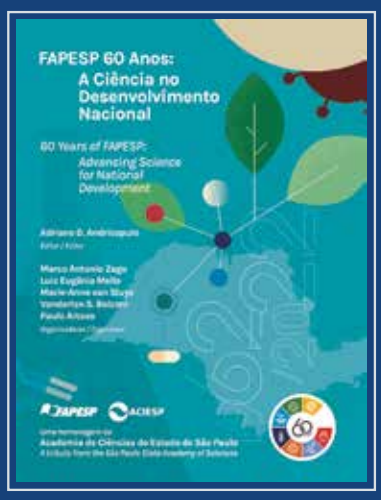


FAPESP 60 YEARS: SCIENCE, CULTURE AND DEVELOPMENT

The tenth and last digital installment of a book entitled *FAPESP 60 anos – Ciência, cultura e desenvolvimento* was issued in April 2022. Edited by Carlos Vogt, a former President of FAPESP and a former Rector of the State University of Campinas (UNICAMP), the book recounts FAPESP's activities in the six decades since its inception and the achievements of researchers in São Paulo State. All ten chapters of the book are available in Portuguese at **60anos.fapesp.br/livro**. The chapter headings are as follows: Six decades of achievements, DNA of São Paulo's science, Digital pioneering, Major projects, Evidence-based public policies, Social, cultural and artistic contributions, Innovation and entrepreneurship, Diversity and inclusion, Lessons of the pandemic, and Looking ahead.

FAPESP 60 ANOS: SCIENCE AND BRAZILIAN DEVELOPMENT

Also to commemorate FAPESP's 60th anniversary, the São Paulo State Academy of Sciences (ACIESP) held a series of meetings with senior researchers from Brazil and abroad, as well as young scientists affiliated with institutions across the state, for a critical analysis of the state of the art in science in São Paulo and Brazil, and a discussion of research opportunities in the years ahead. The topics analyzed were discussed in seven seminars and summarized in eight chapters of *FAPESP 60 anos: A Ciência no desenvolvimento nacional*. The complete book in Portuguese can be accessed at: **fapesp.br/publicacoes/2022/aciesp_livro**.pdf. Separate chapters are available at: **60anos.fapesp.br/aciesp-eventos**.



COMMEMORATIVE CONCERT

On the evening of May 30, 2022, a concert took place at Sala São Paulo to celebrate FAPESP's 60th anniversary. It featured the University of São Paulo Symphony Orchestra (OSUSP) conducted by Luiz de Godoy; the Municipal Theatre Choir conducted by Maíra Ferreira; the Campinas Contemporary Choir conducted by Ângelo José Fernandes; the Percussion Group at São Paulo State University's Arts Institute led by Carlos Stasi and Eduardo Gianesella; and soprano Érika Muniz, mezzo-soprano Laiana Oliveira, tenor Marcus Loureiro and bass Luis Felipe Sousa, with Gabriele Leite playing solo guitar. The program included Mozart's Requiem, in memory of the Brazilians who died from COVID-19 (then more than 660,000); and pieces by the best Brazilian composers, from Villa-Lobos and Camargo Guarnieri to Antônio Carlos Jobim and Ary Barroso. The concert was broadcast by TV Cultura and can be watched on YouTube **www.youtube.com/watch?v=UlYQwn3gZhs.**

Photos: Claudia Mifano

FAPESP 60 YEARS SCHOOLS

The events held to celebrate FAPESP's 60th anniversary included two São Paulo Schools of Advanced Science:

7 a 10 de agosto de 2022

The forecast that Earth's average temperature will rise 2 degrees Celsius (ºC) by the end of the century has not been taken seriously by most governments and corporations around the world.

Even if all the countries that have promised to reduce emissions of carbon dioxide (CO2) fulfill their commitments, global temperatures are likely to continue rising. Mitigation must remain a priority, but we must also prepare to adapt to a rise of 3ºC-5ºC by 2100. This is the view of climate scientist Guy Brasseur, Director of the Max Planck Institute for Meteorology in Germany.

Brasseur was a member of the United Nations Intergovernmental Panel on Climate Change (IPCC) when it shared the Nobel Peace Prize with Al Gore in 2007. He was the keynote speaker on the last day of the School.

21 a 24 de agosto de 2022

Among the topics discussed by the participants was a study conducted by the researchers at the Center for Metropolitan Studies (CEM), one of the Research, Innovation and Dissemination Centers (RIDCs) supported by FAPESP. According to the preliminary results, social inclusion improved steadily in Brazil from its return to democracy in 1984 until 2014, as evidenced by the fact that incomes for the poorest members of the population rose faster than for the richest, owing to factors such as pay raises and spending on public policies for the most vulnerable. The consistent decrease in income inequality began reversing in 2015, when it was interrupted by a severe labor market crisis. In this context, the poorest have lost most to the sharp fall in employment and wages combined with a lack of social policies to protect them and sharp cuts to social programs.

FAPESP 60 YEARS CONFERENCES

Besides the seven conferences held in 2021 as part of the celebration of FAPESP's 60th anniversary, nine more mobilized the scientific community in 2022:

60anos.fapesp.br/conferencias

DIGITAL CULTURE

November 23, 2022

Researchers affiliated with the University of São Paulo's School of Architecture and Urbanism (FAU-USP) and the Federal University of Rio de Janeiro (UFRJ) examined the impact of digital culture on discussions of contemporary life.

RACISM IN TODAY'S SOCIETY

October 19, 2022

Sociologists from Duke University in the United States and the University of São Paulo's School of Philosophy, Letters and Human Sciences (FFLCH-USP) discussed the chief theoretical and methodological challenges of trying to understand contemporary racism in both countries.

ASTRONOMY AND ASTROPHYSICS

September 21, 2022

Discussions of new instruments that deepen our knowledge of gravitational waves, neutrinos and cosmic rays were led by Brian Schmidt, Vice Chancellor and President of the Australian National University (ANU) and winner of the 2011 Nobel Prize in Physics for the discovery of dark energy; Angela Olinto, Dean of the Physical Sciences Division of the Department of Astronomy and Astrophysics at the University of Chicago in the United States; and Rob Adam, Managing Director of the South African Radio Astronomy Observatory (SARAO), which leads his country's participation in the Square Kilometer Array Observatory (SKAO), the world's largest radio telescope.

POVERTY AND INEQUALITY

August 17, 2022

Scholars met at a conference to investigate recent developments in China and Brazil.

QUANTUM MATERIALS

July 20, 2022

Researchers discussed recent developments in quantum materials, identifying challenges and opportunities in quantum technology.

THREATS TO DEMOCRACY

June 22, 2022

A seminar was held to discuss the available evidence pointing to the possibility of a breakdown in democracy in countries like Brazil.

LAND USE AND FOOD PRODUCTION

April 20, 2022

The eleventh conference focused on matters relating to land use and food production, both of which are crucial to food security and sustainability.

INDUSTRY AND INNOVATION

March 23, 2022

Experts discussed the importance of technological innovation and its key role for FAPESP, as well as many other institutions.

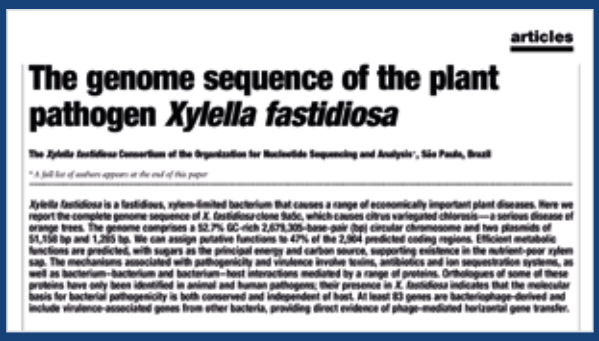
MODERNISM IN THE CONTEXT OF BRAZILIAN STUDIES AND THE CULTURAL AGENDA

February 16, 2022

Researchers analyzed the impact of modernism on Brazil's cultural agenda, the humanities and Brazilian studies.

THE LEGACY OF THE GENOME PROJECT

As part of the commemorations of FAPESP's 60th anniversary, the Genome 20+2 Conference held in November 2022 analyzed the progress achieved in research conducted under the aegis of the program that was launched by FAPESP in 1997 and three years later won its first international recognition with the publication of a cover story in *Nature* on the whole-genome sequencing of *Xylella fastidiosa*, the bacterium that causes citrus variegated chlorosis (CVC), known to Brazilian orange growers as amarelinho because it causes yellowing of leaf tissue due to lack of chlorophyll. The disease was then ravaging orange groves in São Paulo state.


articles

The genome sequence of the plant pathogen *Xylella fastidiosa*

Nature, vol. 406, issue no. 6792 (July 13, 2000)

It was a "bold initiative" that transformed science in São Paulo, said Marco Antonio Zago, President of FAPESP, in his address to the event, held on November 21-22 to celebrate the scientific leap that inaugurated research in genomics and molecular biology in Brazil 22 years ago.

60anos.fapesp.br/genomeworkshop/en

As José Fernando Perez, FAPESP's Scientific Director when the Genome Project was launched, recalled in his presentation, it was not so much about *Xylella* as about capacity building. It laid the physical and human foundations for similar projects to be undertaken once this first challenge had been surmounted, such as the sequencing of several other organisms that were important to the health of people, animals and plants.

This first initiative was followed by the sequencing of sugarcane, of *Xanthomonas citri* (the bacterium that causes citrus canker), and of genes expressed in human tumors, among others.

Researcher examines orange leaves contaminated by Xanthomonas citri, the bacterium that causes citrus canker, in the laboratory at the Sylvio Moreira Citrus Center in Cordeirópolis, part of the Campinas Institute of Agronomy (IAC).
Photo: Léo Ramos Chaves

Twenty-two years later, the legacy of the FAPESP Genome Project can be seen in the progress of personalized medicine, gene therapy, vaccine development, and research on the phylogenetic evolution of biodiversity, to take just a few examples.

The knowledge acquired at that time, Zago stressed, proved essential during the COVID-19 pandemic, enabling Brazilian scientists to sequence SARS-CoV-2 in 48 hours, while other countries took two weeks on average.

The first session was on pathogen genomics and was chaired by Marie-Anne Van Sluys, a professor at the University of São Paulo (USP) and a member of FAPESP's Adjunct Panel on Special Programs and Research Collaboration. The other speakers besides Perez were Alessandra Alves de Souza (IAC), Jorge Elias Kalil Filho (USP), João Marcelo Pereira Alves (USP), and Anna Childers (USDA).

The second session dealt with agri-environmental genomics and was chaired by Luis Eduardo Aranha Camargo, a professor at USP. The speakers included Paulo Arruda, a professor at the State University of Campinas (UNICAMP) and head of the Genomics for Climate Change Research Center (GCCRC), an Engineering Research Center (ERC) supported by FAPESP and Brazilian Agricultural Research Corporation (EMBRAPA).

In parallel with the conference, an exhibition showcased memories of the FAPESP Genome Project, listing the laboratories and researchers involved in the sequencing of *Xylella* and displaying photographs of tributes being paid to the scientists by Mario Covas, then governor of São Paulo, and former President Fernando Henrique Cardoso, with items on research projects grounded in the knowledge acquired and applied in later sequencing initiatives.

Recollections of key participants in the FAPESP Genome Project

60anos.fapesp.br/genomeworkshop/en/videos

- **José Fernando Perez**, then FAPESP's Scientific Director
- Biologist **Fernando Reinach**, founder of venture capital firm Pitanga and one of the scientists who envisioned the Genome Project when he was a member of FAPESP's Area Panel for Biology.
- British bioscientist **Andrew Simpson** headed the Genetics Laboratory at the Ludwig Institute for Cancer Research in São Paulo when he was invited to coordinate the gene sequencing of *Xylella fastidiosa*, the first step in the FAPESP Genome Project, in 1997.
- **Chi Van Dang**, Scientific Director of the Ludwig Institute for Cancer Research in New York, speaks about his optimistic view of the future of oncology, with advances in treatment and the development of tools to identify tumors at a very early stage.
- Biologist **Paulo Arruda**, a specialist in plant genetics, was responsible at the time for one of the foremost laboratories in terms of training researchers and is now the principal investigator (PI) for the Genomics for Climate Change Research Center (GCCRC), funded by FAPESP and EMBRAPA at the State University of Campinas (UNICAMP).
- In 2000, **Marco Antonio Zago**, President of FAPESP, was the head of the Molecular Hematology Laboratory at the University of São Paulo's Ribeirão Preto Medical School (FMRP-USP), one of the 33 laboratories in the network that sequenced the *Xylella fastidiosa* genome.
- **João Setúbal**, bioinformatics coordinator for the project, explains that researchers posted sequencing data to a system run by the Organization for Nucleotide Sequencing and Analysis (ONSA) network.

José Fernando Perez
Photo: Eduardo Cesar

Fernando Reinach
Photo: Eduardo Cesar

Andrew Simpson
Photo: Miguel Boyayan

- **Emmanuel Dias-Neto**, of A.C.Camargo Cancer Center's International Research Center (CIPE), talks about the relevance of the FAPESP Genome Project to his career.
- **Antonio Juliano Ayres**, general manager of Fundecitrus, the citrus protection fund, talks about phytosanitary alerts and the falling incidence of citrus variegated chlorosis (CVC), which attacks orange trees all over the world.

Researchers who participated in the *Xylella fastidiosa* sequencing and cancer genome projects describe the impact of these initiatives on their academic trajectories:

- **Elizabeth Leme Martins** was a researcher at Butantan Institute in 1997, when her laboratory was invited to join the ONSA network and participate in the first stage of the FAPESP Genome Project: the whole-genome sequencing of the bacterium *Xylella fastidiosa*, which causes a serious citrus disease.
- **Anamaria Camargo**, head of research at Hospital Sírio-Libanês, was a postdoctoral fellow under Andrew Simpson's supervision at the Ludwig Institute for Cancer Research in 1997, and talks about the importance of the two projects to her genomics training.
- **Mariana Cabral de Oliveira**, a professor at the University of São Paulo's Institute of Biosciences (IB-USP), uses genomics tools to research marine diversity.
- **João Paulo Kitajima**, , co-founder and director of Mendelics Análise Genômica, was a postdoctoral fellow at the Bioinformatics Laboratory of the State University of Campinas (UNICAMP) and recalls how the project "opened the doors to entrepreneurship" for him.
- **Dirce Maria Carraro** took part in several genome sequencing projects while she was a postdoctoral fellow. The experience enabled her to join the team at the Ludwig Institute of Cancer Research. She later became the leader of a cancer research project at A.C.Camargo Cancer Center.

Ana Cláudia Rasera da Silva, Marilis do Valle Marques, Elizabeth Angélica Leme Martins, Anamaria Aranha Camargo, Mariana Cabral de Oliveira, Claudia Monteiro Vitorello and Marie-Anne Van Sluys, winners of the CLAUDIA 2000 Prize for the whole-genome sequencing of *Xylella fastidiosa*.

Photo: Egberto Nogueira, *CLAUDIA* magazine

CHAPTER

2

GENERAL INDICATORS

- Income and Total Disbursement for research funding in 2022
- Disbursement, active projects and projects contracted – 2022

  By Funding Strategies

  By Major Knowledge Areas

  By Institution

  By Scholarship/Fellowship and grant per funding strategie

- Annual evolution of disbursement – 2016 to 2022
- Annual evolution in projects contracted – 2016 to 2022
- FAPESP's total income and expenditure in 2022
- New challenges for funders

INCOME

FAPESP's income totaled, in 2022, **$ PPP 858,426,700**.

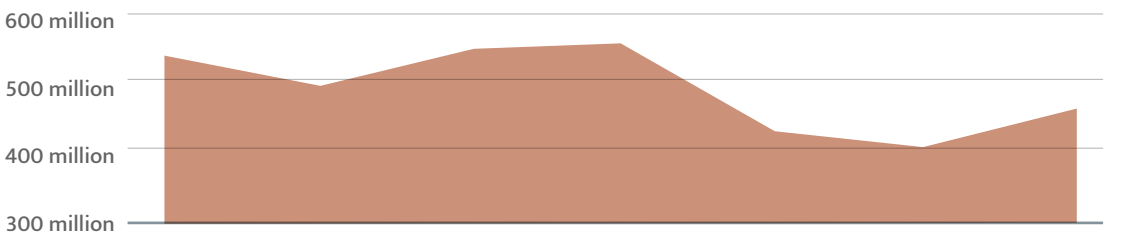
FAPESP's income consists of 1% of São Paulo State's annual tax revenue, transferred by the state treasury in compliance with the state constitution, and receipts from other sources, such as joint research funding agreements with other institutions and companies.

CHART 3 COMPOSITION OF FAPESP'S INCOME – 2022

DISBURSEMENT

In 2022, FAPESP disbursed **$ PPP 458,387,521** to support **20,709** active scientific and technological research projects.

CHART 4 ANNUAL EVOLUTION OF DISBURSEMENT FOR RESEARCH FUNDING ($ PPP)



2016	2017	2018	2019	2020	2021	2022
533,198,350	485,246,052	546,574,884	551,269,903	423,320,342	400,521,367	458,387,521

$ PPP = Purchasing Power Parity. Source: https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm

DISBURSEMENT, NUMBER OF ACTIVE PROJECTS AND NEW PROJECTS CONTRACTED 2022

TABLE 2 BY FUNDING STRATEGIES

Funding Strategies	Disbursement		Active projects		New projects contracted	
	$ PPP	%	Nº	%	Nº	%
Training of Human Resources for ST&I	82,210,026	18.0	7,165	34.5	3,302	38.0
Basic and Applied Research	245,355,280	53.5	9,902	48.0	3,909	45.0
Research for Innovation	38,596,082	8.5	1,518	7.0	724	8.0
Research on Strategic Themes	33,468,200	7.0	1,185	6.0	496	6.0
Support for Research Infrastructure	50,296,608	11.0	924	4.5	278	3.0
Communicating Science to the public	8,461,326	2.0	15	0.0	11	0.0
Total	**458,387,521**	**100.0**	**20,709**	**100.0**	**8,720**	**100.0**

TABLE 3 BY MAJOR KNOWLEDGE AREAS

Major knowledge areas	Disbursement		Active projects		New projects contracted	
	$ PPP	%	Nº	%	Nº	%
Life Sciences	214,094,679	46.7	10,484	50.6	4,366	50.0
Natural Sciences and Engineering	148,793,779	32.5	6,455	31.2	2,690	30.9
Human and Social Sciences	48,644,918	10.6	3,189	15.4	1,429	16.4
Interdisciplinary	46,854,145	10.2	581	2.8	235	2.7
Total	**458,387,521**	**100.0**	**20,709**	**100.0**	**8,720**	**100.0**

TABLE 4 BY INSTITUTION

Institution	Disbursement		Active projects		New projects contracted	
	$ PPP	%	Nº	%	Nº	%
University of São Paulo (USP)	204,989,460	44.7	7,991	38.6	3,191	36.6
University of Campinas (UNICAMP)	71,577,388	15.6	2,885	13.9	1,164	13.3
Federal Research Institutions	57,998,940	12.7	3,341	16.1	1,454	16.7
São Paulo State University (UNESP)	41,971,178	9.2	3,230	15.6	1,457	16.7
State Research Institutions	35,908,612	7.8	972	4.7	389	4.5
Companies	23,145,025	5.0	1,168	5.6	582	6.7
Private Higher Education and Research Institutions	17,673,579	3.9	1,031	5.0	432	4.9
Scientific Associations and Societies	944,104	0.2	31	0.2	25	0.3
Municipal Institutions	382,786	0.1	32	0.2	9	0.1
Others	3,796,450	0.8	28	0.1	17	0.2
Total	**458,387,521**	**100.0**	**20,709**	**100.0**	**8,720**	**100.0**

DISBURSEMENT, NUMBER OF ACTIVE PROJECTS AND NEW PROJECTS CONTRACTED 2022

TABLE 5 SCHOLARSHIPS/FELLOWSHIPS AND GRANTS BY FUNDING STRATEGIES – 2022

Funding Strategies		Disbursement $ PPP	Active projects	New projects contracted
TOTAL		**458,387,521**	**20,709**	**8,720**
TRAINING OF HUMAN RESOURCES FOR RESEARCH		**82,210,026**	**7,165**	**3,302**
Scholarships and Fellowships not associated with research grrants	In Brazil	56,355,583	6,338	2,598
	Abroad	25,854,443	827	704
BASIC AND APPLIED RESEARCH		**245,355,280**	**9,902**	**3,909**
Long-term Research	Thematic Project Grant and associated scholarships/ fellowships and grants	183,083,466	3,730	1,397
	Research, Innovation and Dissemination Centers (RIDC) and associated scholarships/fellowships and grants	109,880,817	785	294
	Young Investigator grants and associated scholarships, fellowships and grants	36,319,579	1,451	563
	Special Project grants and associated scholarships, fellowships and grants	32,583,118	18	12
	São Paulo Excellence Chair (SPEC) and associated scholarships, fellowships and grants	767,059	66	17
Subtotal		**3,532,893**	**6,050**	**2,283**
Regular Research Grants not associated with other grants	Regular Research Grants not associated to other grants and associated scholarships/fellowships	62,271,814	3,217	1,107
	Regular Grants (meetings, organization, publications, visiting researchers) not associated to other grants	55,888,598	635	519
Subtotal		**6,383,216**	**3,852**	**1,626**
RESEARCH FOR INNOVATION		**38,596,082**	**1,518**	**724**
	Research Partnership for Technological Innovation Program (PITE) and associated scholarships/fellowships and grants	2,236,522	72	20
	Engineering Research Centers/Applied Research Centers (ERC/ARC) and associated scholarships/fellowships and grants	10,646,179	280	124
	Innovative Research in Small Business Program (PIPE), Fellowship PE and associated scholarships/fellowships and grants	22,987,306	1,157	578
	Intellectual Property Support Program (PAPI-Nuplitec) and associated scholarships/fellowships and grants	248,525	9	2
	Innovation Distritcts	2,477,550	0	0
RESEARCH ON STRATEGIC THEMES		**33,468,200**	**1,185**	**496**
	FAPESP Research Program on Biodiversity Characterization, Conservation, Restoration and Sustainable Use (BIOTA) and associated scholarships/fellowships and grants	7,285,446	361	132
	FAPESP Bioenergy Research Program (BIOEN) and associated scholarships/fellowships and grants	4,057,907	169	61

DISBURSEMENT, NUMBER OF ACTIVE PROJECTS AND NEW PROJECTS CONTRACTED 2022

Funding Strategies		Disbursement R$	Active projects	New projects contracted
	FAPESP Research Program on Global Climate Change (RPGCC) and associated scholarships/fellowships and grants	8,086,728	233	83
	FAPESP Research Program on eScience and DataScience and associated scholarships/fellowships and grants	558,870	30	9
	Institutional Development Plan for State Research Institutions (RIs)	7,275,978	145	57
	Research in Public Policies Program (PPP) and associated scholarships/fellowships and grants	4,150,924	84	38
	Public Education Research Program (EP)	200,791	98	56
	Science Journalism (MídiaCiência) fellowships not associated to other grants	118,497	10	7
	Science for Development Centers (SDC-SP)	1,733,060	55	53
SUPPORT FOR RESEARCH INFRASTRUCTURE		**50,296,608**	**924**	**278**
	Multi-User Equipment Program	22,236,056	442	80
	Equipment Repair Program	1,272,107	168	74
	REDNESP	9,892,513	1	0
	Overhead for REDNESP Connectivity	1,892,839	10	4
	Overhead for Research Institution Infrastructure	14,625,265	283	108
	Overhead for Program Coordination	377,829	20	12
COMMUNICATING SCIENCE TO THE PUBLIC		**8,461,326**	**15**	**11**
	Pesquisa FAPESP magazine	3,980,788	1	0
	Dissemination of scientific knowledge in São Paulo State	1,734,929	2	1
	Mapping of research units in São Paulo State (BV)	1,055,204	2	1
	ST&I Indicators for São Paulo State	682,206	10	9
	Others (contrats)	1,008,199	0	0

ANNUAL EVOLUTION OF DISBURSEMENT ($ PPP) – 2016 TO 2022

TABLE 6 BY FUNDING STRATEGIES – DISBURSEMENT

Funding Strategies		2022	2021	2020	2019	2018	2017	2016
Training of Human Resources for Research		82,210,026	69,907,938	98,061,692	130,559,806	131,522,911	135,402,194	156,512,055
Basic and Applied	Long-term research	183,083,466	173,961,686	152,179,415	188,499,668	190,850,872	160,832,022	158,208,236
	Regular Grants not associated to other grants	62,271,814	48,815,893	44,259,418	87,936,995	89,869,416	85,922,183	99,878,205
Research for Innovation		38,596,082	34,245,414	42,568,890	50,034,027	51,022,082	39,542,186	35,156,333
Research on Strategic Themes		33,468,200	26,054,915	22,992,180	33,066,684	24,536,592	17,606,051	18,490,279
Support for Research Infrastructure		50,296,608	40,459,367	56,474,563	53,246,198	51,216,717	39,344,201	58,610,665
Communicating Science to the Public		8,461,326	7,076,154	6,784,184	7,926,525	7,556,294	6,597,215	6,342,577
Total		458,387,521	400,521,367	423,320,342	551,269,903	546,574,884	485,246,052	533,198,350

TABLE 7 BY TYPES OF SCHOLARSHIPS/FELLOWSHIPS AND GRANTS ($ PPP)

Types	2022	2021	2020	2019	2018	2017	2016
Scholarships/Fellowships[1]	194,975,424	163,489,765	198,924,248	236,799,075	225,612,672	212,596,872	223,406,194
Grants[2]	263,412,098	237,031,602	224,396,094	314,470,828	320,962,212	272,649,180	309,792,156
Total	458,387,521	400,521,367	423,320,342	551,269,903	546,574,884	485,246,052	533,198,350

For a detailed breakdown of disbursements for all types of scholarships and grants in 2021, see pages 138 and 140.
(1) Scholarships = Regular scholarships (IC, MS, DR, DD, PD) in Brazil and abroad, and scholarships for technical training (CT), science journalism (JC), academic training (PC), Young Investigators (JP), research in small enterprises (PE) and public education (EP), which may or may not be linked to grants.
(2) Grants = all research grants.

ANNUAL EVOLUTION OF THE NUMBER OF PROJECTS CONTRACTED – 2016 TO 2022

TABLE 8 BY FUNDING STRATEGIES

Funding Strategies		2022	2021	2020	2019	2018	2017	2016
Training of Human Resources for Research		3,302	2,496	2,557	3,921	4,386	4,021	4,389
Basic and Applied	Long-term research	2,283	1,641	1,612	2,330	2,048	1,881	1,594
	Regular Grants not associated to other grants	1,626	1,338	1,503	2,657	2,960	2,924	3,249
Research for Innovation		724	756	756	733	836	731	650
Research on Strategic Themes		496	317	360	454	344	314	268
Support for Research Infrastructure		278	273	237	337	359	310	327
Communicating Science to the Public		11	2	2	11	13	5	3
Total		8,720	6,823	7,027	10,443	10,946	10,186	10,480

TABLE 9 BY TYPES OF SCHOLARSHIPS/FELLOWSHIPS AND GRANTS

Types	2022	2021	2020	2019	2018	2017	2016
Scholarships/Fellowships[1]	6,650	5,067	5,035	7,107	7,276	6,584	6,653
Grants[2]	2,070	1,756	1,992	3,336	3,670	3,602	3,827
Total	8,720	6,823	7,027	10,443	10,946	10,186	10,480

For a detailed breakdown of contracts for all types of scholarships and grants in 2021, see pages 139 and 141.
(1) Scholarships = Regular scholarships and fellowships (Scientific Initiation, IC; Master's, MS; Doctorate, DR; Direct Doctorate, DD; Postdoctorate, PD) in Brazil and abroad, and scholarships for technical training (CT), science journalism (JC), academic training (PC), Young Investigators (JP), research in small enterprises (PE) and public education (EP), which may or may not be linked to grants.
(2) Grants = all research grants.

FAPESP'S TOTAL INCOME AND EXPENDITURE IN 2022

FAPESP's budget execution in 2021 is summarized below. The funding activities described in the Report, as well as the other main items of income and expenditure, are shown on a cash flow basis. FAPESP's complete financial statements on an accrual basis, as required by law, can be found on its website at fapesp.br/balancos.

TABLE 10
INCOME AND DISBURSEMENT IN 2022

INCOME	$ PPP
State Treasury Transfers	739,493,193
Federal funds	1,369,470
Own income (net)	117,564,036
TOTAL	**858,426,700**
DISBURSEMENT	
Grants	263,412,098
Fellowships and Scholarships	194,975,424
Other expenses associated with grants	13,298,361
Refunds relating to cooperation agreements	439,012
Running costs*	34,932,643
Institutional investment	3,439,158
TOTAL	**510,496,696**
Cash and cash equivalents at year-end	347,930,004

TABLE 11
COMMITMENTS IN 2022

By grants and fellowships/scholarships

COMMITMENTS	$ PPP
Grants	561,250,958
Fellowships and Scholarships	209,965,096
TOTAL	**771,216,054**

* FAPESP is required by law to limit running costs to 5% of its annual budget, which in 2022 was $ PPP 818,260,266, resulting in a cap of $ PPP 40,913,013.

TABLE 12

INVESTMENTS UNDERTAKEN TO SUPPORT RESEARCH – 2022 ($ PPP)

By funding strategy and running costs

INVESTMENT IN SUPPORT FOR RESEARCH	2021 commitments not disbursed	Grants awarded in 2022	Total commitments	Total disbursements	Balance (commitments)
Research for Innovation	56,209,986	44,030,726	100,240,711	38,596,083	61,644,629
Basic and Applied Research	471,903,972	243,304,635	715,208,606	245,355,280	469,853,327
Research on Strategic Themes	63,191,160	52,470,229	114,886,195	33,468,200	81,417,995
Training of Human Resources for Research	77,056,880	102,540,286	179,597,166	82,210,026	97,387,140
Support for Research Infrastructure	48,373,603	56,038,713	104,412,316	50,296,608	54,115,708
Communicating Science to the Public	5,030,361	10,228,220	15,258,581	8,461,325	6,797,256
Running costs allocated to research funding	0	13,298,361	13,298,361	13,298,361	0
GRAND TOTAL	720,990,768	521,911,168	1,242,901,936	471,685,882	771,216,054

NEW CHALLENGES FOR FUNDERS

The COVID-19 pandemic affected research and knowledge production globally. In 2020 and 2021, universities, research institutions and laboratories were unable to operate normally because of the risk of contagion and the need for social distancing. São Paulo was no exception, and FAPESP experienced a 30% drop in proposal submissions. In the same period, universities experienced a fall in demand for undergraduate and graduate courses, with demand for engineering courses dropping by almost a third. This situation was expected to be temporary, but obstacles persisted in 2022.

Given the adverse aftermath of the pandemic, FAPESP and São Paulo's universities and research institutions must implement measures to assure a return to the previous level of activity.

With this objective in mind, FAPESP is increasing the opportunities for early-career researchers to apply for funding via initiatives such as Projects Generation and Initial ΠΙ (Pi). It is also investing in new modes of PIPE to help small firms connect with FAPESP's well-established programs, and in multiuser equipment, collections, new Research, Innovation and Dissemination Centers (RIDCs), and mission-oriented research (see below for details of some of these initiatives).

NEW GENERATION PROGRAM

To support early-career researchers, FAPESP launched the New Generation Program with two funding lines. Project Generation selects research projects based on bold ideas presented by researchers who graduated less than 11 years previously, earned a PhD less than six years prior to the deadline for submitting proposals, and are not gainfully employed on the contracting date. A Generation scholarship is also awarded to the principal investigator, who must be dedicated exclusively to the project. The other line is Initial Π (Pi), which supports projects submitted by scientists hired at least eight years previously by universities and research institutions. In this case, the PI must also submit a teaching plan associated with the research project, which may include associated master's and PhD scholarships, as well as equipment and other material resources. The funding lasts five years and aims to foster successful careers in research and teaching.

PIPE-KT

To encourage partnerships between small enterprises and higher education and research institutions, FAPESP launched a new modality of the Innovative Research in Small Business Program (PIPE) that focuses on knowledge transfer (KT). PIPE-KT will fund proofs of concept in research that originates in higher education or research institutions and is of interest to small enterprises, strengthening the links between academia, industry and markets. The first call for proposals targeted topics of interest to BIOTA, BIOEN and RPGCC. A call scheduled for 2023 will target topics relating to RIDCs, ERCs, ARCs and SDCs (*see pp. 102 and 104*).

PIPE START

FAPESP launched PIPE Start in 2022 to support the process of designing and developing innovative products or processes when the technological solution or business model is not finalized or validated. This new facet of PIPE targets potential entrepreneurs and startups that need basic knowledge of technological entrepreneurship.

SUPPORT FOR RESEARCH INFRASTRUCTURE

To enhance the quality of scientific and technological research and innovation, helping research groups ensure the ability to work in modern, easily accessible infrastructure with high technological capacity, FAPESP issued three calls for proposals under its Multiuser Equipment Program, relating to multiuser equipment for scientific use, for technological use and innovation, and for document archives and/or historiography and biology collections (*see pp. 122 and 123)*.

PROEDUCA

To support the enhancement and development of public policies and teaching methods that improve educational attainment and reduce inequality in the school system, in 2022 FAPESP and the São Paulo State Department of Education (SEDUC) issued the first of three calls for proposals under the PROEDUCA program for research on basic education (*see pp. 120)*.

RESEARCH, INNOVATION AND DISSEMINATION CENTERS (RIDCS)

In light of the achievements of RIDCs in advancing research in strategic areas, technology transfer and dissemination of knowledge to society, and considering that the 17 RIDCs currently operating will soon embark on the last stage of evaluation, FAPESP decided to set up 18 more RIDCs by 2026, selecting proposals submitted in six cycles divided by major knowledge area. The first call for proposals relating to new RIDCs in health sciences, biological sciences, agricultural sciences and veterinary medicine, was issued in 2021. The results will be announced in 2023 (*see pp. 82-87)*.

SCIENCE FOR DEVELOPMENT CENTERS (SDCS)

To extend the scope of the activities undertaken by SDCs to other public bodies, FAPESP plans to issue a third call for proposals in 2023. The 28 existing SDCs involve collaboration among scientists from universities, research institutions and public bodies in São Paulo State, among others, to develop solutions to challenges previously defined by departments of the state government (*see pp. 114-116)*.

AMAZÔNIA +10

Considering the large number of proposals submitted in response to the Amazon+10 Initiative's first call, and the quality of the projects selected, FAPESP and the 20 FAPs involved decided to issue a second call in 2023. The initiative, which is led by CONFAP, supports collaborative research projects relating to biodiversity conservation and climate change, protection of traditional communities, urban challenges and the bioeconomy in the Amazon (*see pp. 152-155)*.

COVID-19 SPECIAL

COVID-19 and research
in São Paulo State

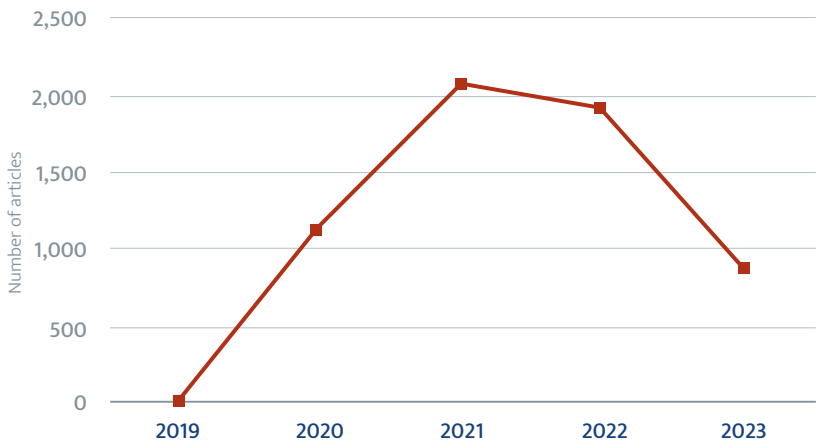
ANNUAL REPORT
FAPESP

2022

The COVID-19 pandemic caused by the novel coronavirus SARS-CoV-2 took the world by surprise. Its impact on Brazil and São Paulo was huge. Many coronaviruses were already well-known, but research on this one was incipient. In 2020 and 2021, FAPESP issues calls for research proposals relating to COVID-19, and approved 91 projects for investment of more than $ PPP 12 million. In first-quarter 2020 (Figure 1), the number of publications on the subject rose significantly. They surpassed 2,000 in 2021 and reached more than 6,000 all told, corresponding to 36% of nationwide production measured in terms of scientific articles on the subject. The number of publications remained high in 2022, albeit not at the same level as in the previous year.

FIGURE 1 NUMBER OF ARTICLES PER YEAR ON COVID-19

Published in indexed journals by researchers in São Paulo

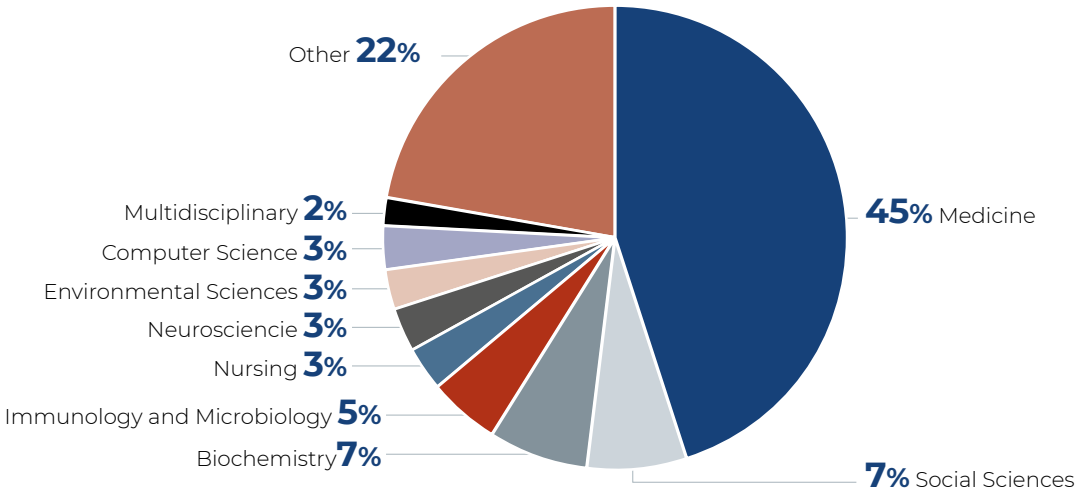


Database: Scopus

The knowledge areas present in these articles included medicine and nursing, immunology and microbiology, but there were also many in social sciences and biochemistry, constituting the second-largest group (Figure 2).

FIGURE 2

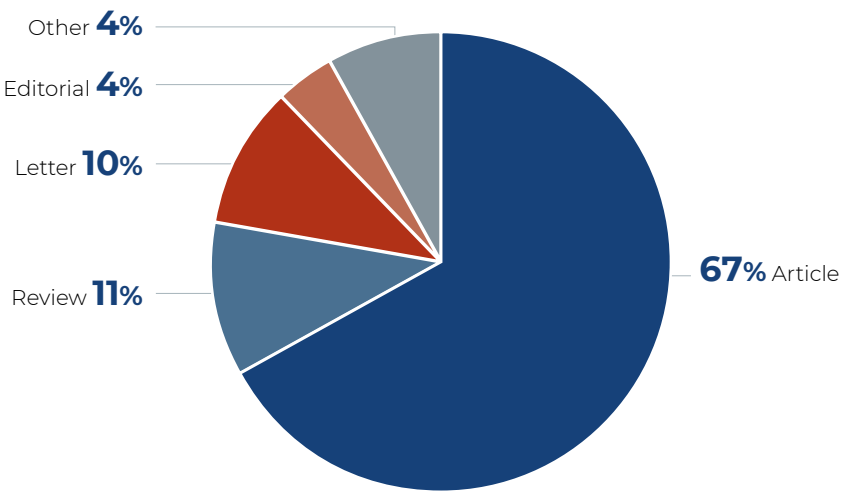
KNOWLEDGE AREAS DISCUSSED IN ARTICLES ON COVID-19 – BY RESEARCHERS IN SÃO PAULO



Almost 70% of the publications were articles (Figure 3) and 11% were literature reviews.

FIGURE 3

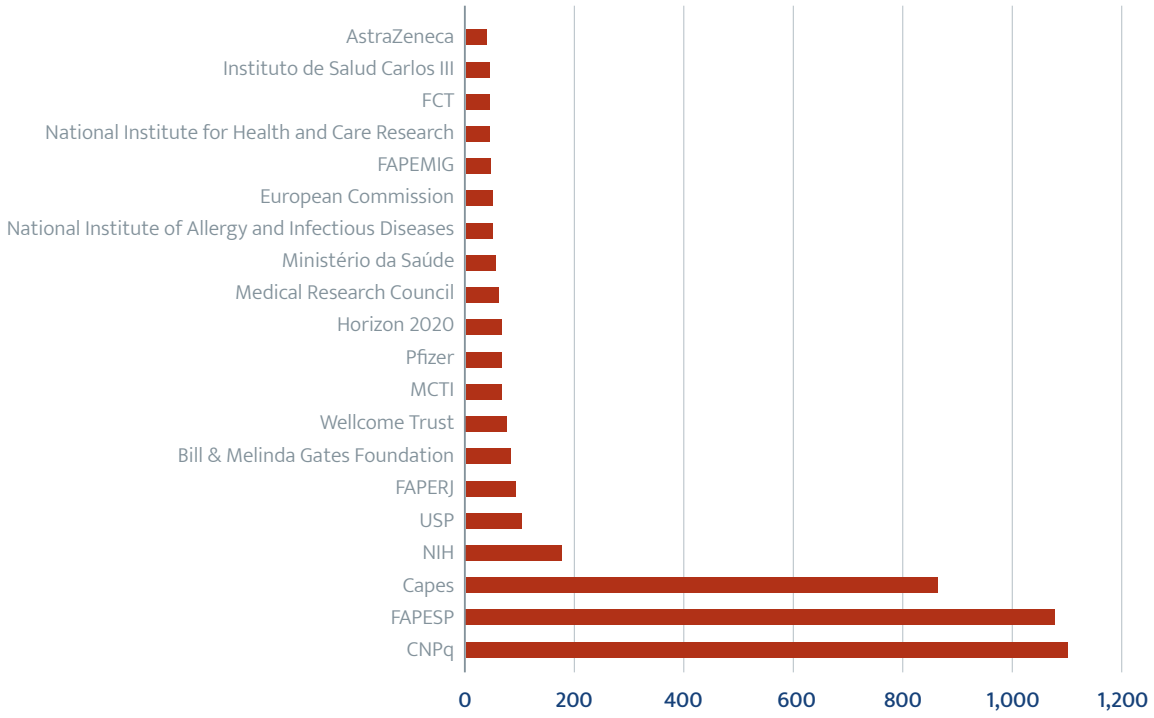
TYPE OF PUBLICATION ON COVID-19 – BY RESEARCHERS IN SÃO PAULO



The main research funders (Figure 4) evidenced interaction among the federal and state governments, and domestic and foreign private and public companies.

FIGURE 4 FUNDING OF COVID-19 STUDIES

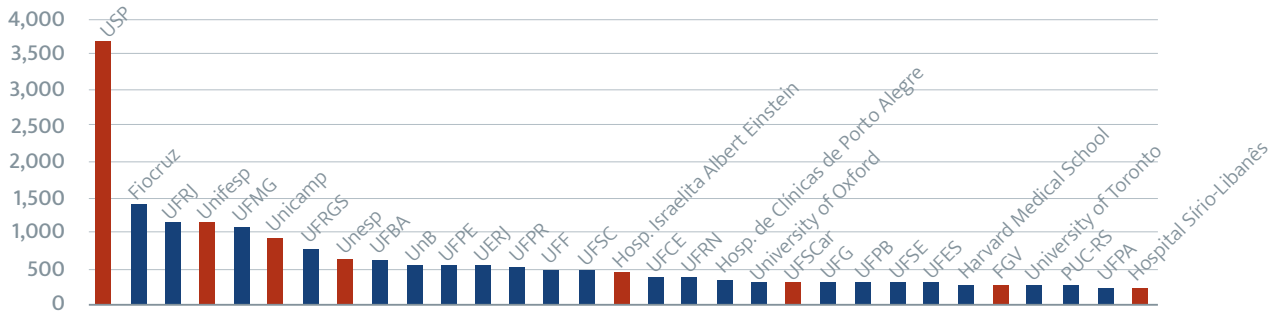
By researchers in São Paulo



The data also evidences the importance of research in São Paulo to the fight against the pandemic: three of the state's universities ranked among the top six throughout Brazil by number of publications (Figure 5). The University of São Paulo (USP) had almost three times as many publications as the institution ranked next.

FIGURE 5

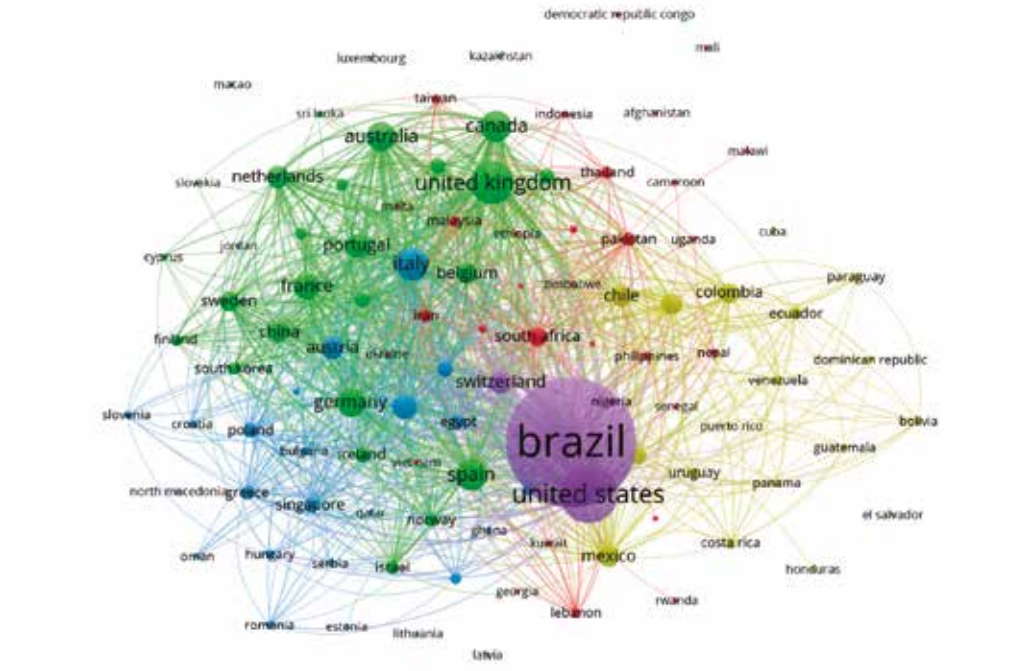
INSTITUTIONS PUBLISHING ON COVID-19 IN BRAZIL OR IN COLLABORATION WITH BRAZILIAN RESEARCHERS



Research conducted in São Paulo was part of the global effort to understand and contain the disease (Figure 6). Brazilian researchers belonged to several networks (different colors) in South and Central America (*yellow*), Western Europe (*green*), Eastern Europe and Asia (*blue*), and some Asian countries (*red*).

FIGURE 6

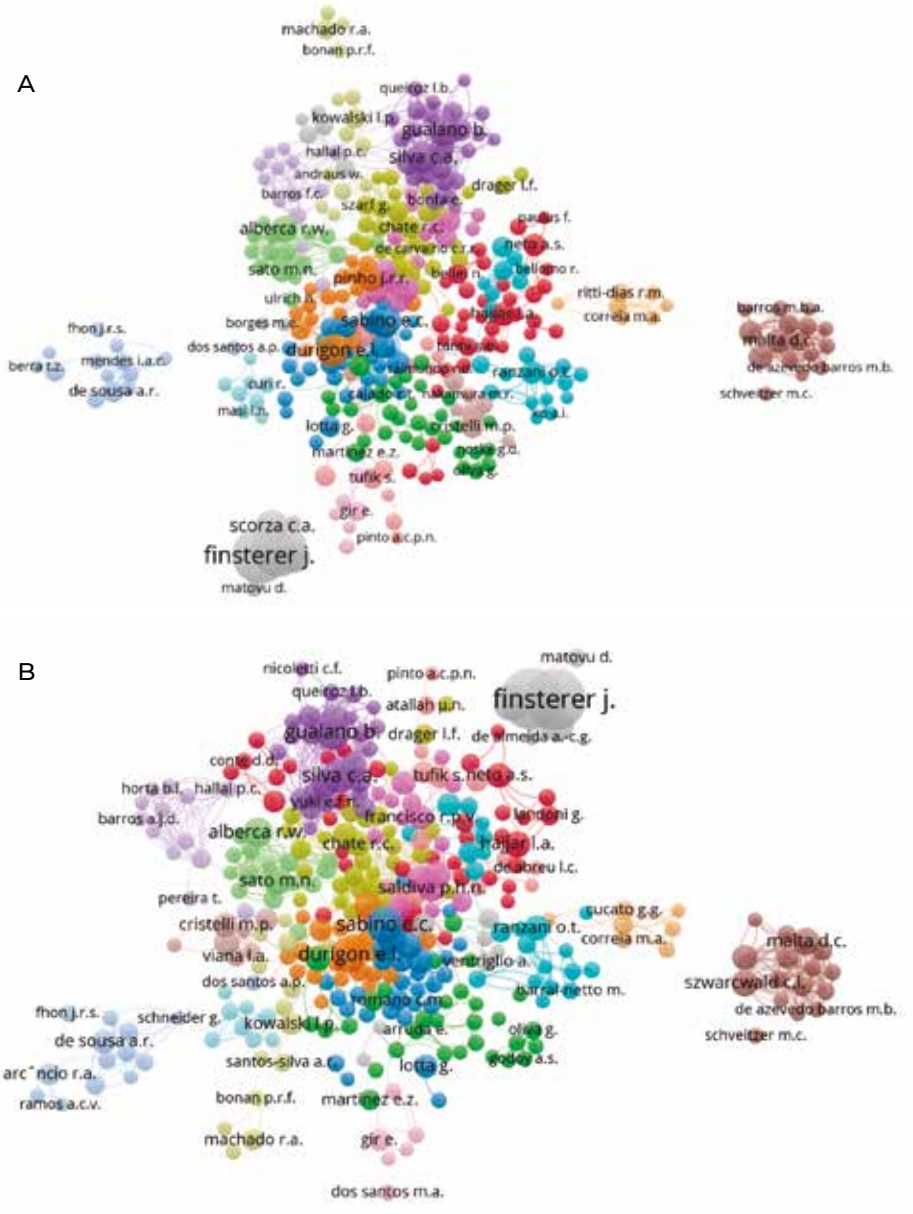
NETWORKS OF COUNTRIES INVOLVING RESEARCHERS IN SÃO PAULO IN COVID-19 STUDIES



The main COVID-19 research groups in São Paulo are shown in Figures 7a and 7b (from different perspectives). Some include foreign researchers alongside researchers based in São Paulo, while others are led by researchers based in São Paulo. They conduct research in several areas of medicine, such as virology, pathology, hepatology and intensive care, as well sports medicine, nursing and lifestyles, among others. It is fundamental to stress the importance of RIDCs to the COVID-19 response.

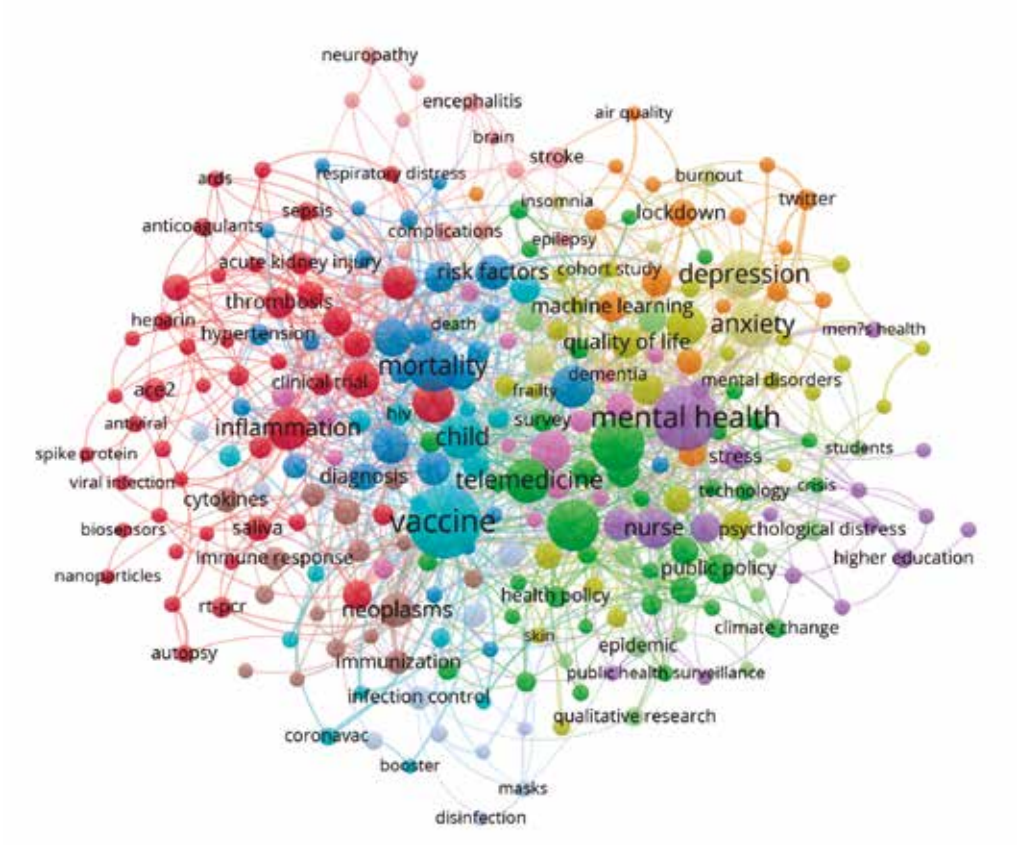
FIGURE 7

COVID-19 RESEARCH GROUPS IN SÃO PAULO FROM TWO DIFFERENT PERSPECTIVES



COVID-19 research areas are shown in Figure 8, ranging from mental health (*yellow*) to vaccination (*light blue*), policy (*green*), medical matters (*red*), and artificial intelligence, fake news etc. (*orange*).

FIGURE 8 COVID-19 TOPICS STUDIED BY RESEARCHERS IN SÃO PAULO



CHAPTER

3

FUNDING STRATEGIES

- Training of Human Resources for Research
- Basic and Applied:
  - Long-term research and
  - Regular Grants not associated to other grants
- Research for Innovation
- Research on Strategic Themes
- Support for Research Infrastructure
- Communicating Science to the Public

TRAINING OF HUMAN RESOURCES FOR RESEARCH

FAPESP awards several types of regular scholarships and fellowships for undergraduates and graduates who reside in São Paulo State to train in Brazil and abroad. Regular scholarships and fellowships in Brazil support academic education and training at different levels: Scientific Initiation (IC), Master's (MS), Doctorate (DR), Direct Doctorate (DD), and Postdoctorate (PD).

In 2022

$ PPP 82.2 million
7,165 active projects.
3,302 new projects.

FAPESP has an agreement with the Ministry of Education's Higher Research Council (CAPES) to fund MS, DR and DD scholarships, as well as PD fellowships.

In February 2022, FAPESP increased the amount of the scholarships it awards in Brazil by 15%, after four years without any raises.

FAPESP awards two types of funding for education and training abroad: Research Fellowships Abroad (BPE) for postdoctoral research; and Research Internships Abroad (BEPE) for use while scholarships in Brazil are in progress. It considers the experience of research abroad a key component of the training of new researchers. This investment can be seen in Table 13 and 14.

FAPESP also offers the Research Career Consolidation Mentoring Initiative, a series of online events held periodically to help scholarship awardees with their scientific training.

Other education and training scholarships are awarded under the budgets for the grants with which they are associated (*see pp. 138-139*). In 2022, FAPESP contracted for 2,136 new regular scholarships associated with grants and disbursed $ PPP 94,648,487 for 5,236 associated active scholarships, of which $ PPP 72,729,020 for scholarships in Brazil and $ PPP 21,919,467 for scholarships abroad.

TYPES

REGULARES SCHOLARSHIPS/ FELLOWSHIPS NOT ASSOCIATED WITH GRANTS

IN BRAZIL

Scientific Initiation (SI)

Master's (MS)

Doctorate (DR)

Direct Doctorate (DD)

Direct Doctorate MD-PhD

Postdoctorate (PD)
www.fapesp.br/en/postdoc

ABROAD

Research Fellowships Abroad (RFA)

Research Internships Abroad (RIA)
www.fapesp.br/en/bepe

Partnership with ABC – An agreement between the Brazilian Academy of Sciences (ABC) and FAPESP signed in 2022 for a five-year period renewable for five more years will fund summer internships for 50 undergraduates per year at laboratories led by titular members of ABC. The initiative is part of the Aristides Pacheco Leão Program to Foster Scientific Vocations.

Table 13 shows the amounts disbursed for regular training scholarships not associated with other research grants, as well as the number of active scholarships and new scholarships contracted for in the year. Table 14 shows the amounts disbursed and the number of scholarships contracted for by major knowledge area.

TABLE 13

TRAINING OF HUMAN RESOURCES FOR RESEARCH

Types of scholarships/fellowships, disbursement, number of actives projects and new projects contracted for in 2022

Regular Scholarships/Fellowships not associated to grants	Disbursement $ PPP	Active projects	New projects contracted
In Brazil	56,355,583	6,338	2,598
Scientific Initiation	6,165,126	2,924	1,466
Master's (MS)	5,506,367	855	389
Doctorate (DR)	21,179,533	1,498	406
Direct Doctorate (DD)	4,855,600	365	101
Aristides P. Leão Program to Stimulate Scientific Vocations	111,780	0	33
Postdoctorate (PD)	18,537,177	696	203
Abroad	25,854,443	827	704
Research Internships Abroad (RIA)	22,553,5412	697	584
RIA – IC	1,001,780	81	82
RIA – MS	1,699,298	100	95
RIA – DR	8,892,848	318	245
RIA – DD	2,091,260	74	64
RIA – PD	7,317,968	124	98
Research Fellowships Abroad (RFA) – PD	4,851,2889	130	120
Total	82,210,026	7,165	3,302

TABLE 14

TRAINING OF HUMAN RESOURCES FOR RESEARCH

Types of scholarships/fellowships, disbursement, number of actives projects and new projects contracted by knowledge areas

Scholarships/ Fellowships	Life Sciences		Natural Sciences and Engineering		Human and Social Sciences		Interdisciplinary	
	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted
In Brazil	28,502,040	1,490	11,561,104	578	16,244,620	528	47,820	2
Abroad	11,399,835	293	6,222,301	182	8,232,306	229	0	0
RIA	9.,924,040	256	4,451,335	143	6,627,779	185	0	0
RFA	1,475,796	37	1,770,966	39	1,604,527	44	0	0
Total	39,901,875	1,783	17,783,405	760	24,476,926	757	47,820	2

MEDIA COVERAGE OF RESEARCH RESULTS: SCHOLARSHIPS/FELLOWSHIPS

Study proposes involvement of young people in risk mapping and environmental disaster prevention

A research project conducted by the National Disaster Surveillance and Early Warning Center (CEMADEN) developed a risk mapping methodology in collaboration with vulnerable communities to predict the effects of floods, landslides and heavy rain. The methodology can be used in any part of Brazil.

INTERDISIPLINARY

RIA – FAPESP Process 2018/06093-4

INSTITUTIONS: CEMADEN and University of Colorado Boulder (EUA)
PRINCIPAL INVESTIGATOR (PI): Jennifer Tobin
GRANTEE: Victor Marchezini

551 media outlets

agencia.fapesp.br/38090

Researchers identify genes potentially responsible for sugarcane's resistance to pests, cold and drought

A study conducted at the State University of Campinas's Center for Molecular Biology and Genetic Engineering (CBMEG-UNICAMP) provides a foundation for future research to confirm identification of the best candidate genes for biotech applications such as insertion into commercially valuable plants and development of sugarcane varieties resistant to environmental pressures.

GENETICS

PD Fellowship – FAPESP Process 2015/16399-5

INSTITUTION: CBMEG-Unicamp

PI: Anete Pereira de Souza

GRANTEE: Cláudio Benício Cardoso da Silva

36 media outlets

agencia.fapesp.br/39671

MEDIA COVERAGE OF RESEARCH RESULTS: SCHOLARSHIPS/FELLOWSHIPS

Novel sewage treatment system removes up to 70% of nitrogen that would otherwise be discarded into nature

SANITARY ENGINEERING

RFA-DR – FAPESP Process 2018/17064-5

INSTITUTIONS: EESC-USP and University of Notre Dame (EUA)

PI IN BRAZIL: Eugenio Foresti

PI ABROAD: Robert Nerenberg

GRANTEE: Bruno Garcia Silva

44 media outlets

agencia.fapesp.br/38924

Developed by a PhD student at the University of São Paulo's São Carlos School of Engineering (EESC-USP), a bacterial biofilm on a sheet of polyurethane foam converts nitrogen compounds in wastewater into nitrogen gas and removes them from water.

In the Amazon, breastfeeding reduces risk of malaria in children under 2 years of age

PARASITOLOGY

DR Scholarship – FAPESP Process 2018/18557-5

INSTITUTION: ICB-USP

PI: Marcelo Urbano Ferreira

GRANTEE: Anaclara Pincelli Cintra

35 media outlets

agencia.fapesp.br/40321

A study conducted by researchers affiliated with the University of São Paulo's Institute of Biomedical Sciences (ICB-USP), involving children born in 2015-16 in Cruzeiro do Sul, Acre State, detected an association between length of breastfeeding and risk of infection by *Plasmodium vivax*, the parasite that causes malaria

BASIC AND APPLIED RESEARCH

Almost half of all the funding disbursed by FAPESP goes to ambitious research projects that set out to advance knowledge and solve problems. Research of this kind requires long-term support and is conducted under the aegis of Thematic Projects, the Young Investigator (JP) and São Paulo Excellence Chair (SPEC) programs, Special Projects, and Research, Innovation and Dissemination Centers (RDICs). It is also supported by Regular Research Grants for fast-track projects.

In 2022

$ PPP 245.3 million

9,902 active projects.

3,909 new projects.

RELATED PROGRAMS

LONG-TERM RESEARCH

Thematic Project Grant – www.fapesp.br/thematic

São Paulo Excellence Chair (SPEC)

Research, Innovation and Dissemination Centers (CEPID/RIDC) – cepid.fapesp.br/en

Young Investigators Grants (JP/YIG) – www.fapesp.br/en/yia

Special Projects

Initial ΠI (PI) Project Research Grants – www.fapesp.br/projetoinicialpi

REGULAR GRANTS NOT ASSOCIATED TO OTHER GRANTS

Research Grants – Regular

Visiting Researcher Award – www.fapesp.br/en/visiting

Publications Award

Participation in Scientific Meeting Award

Organization of Scientific Meeting Award

- São Paulo School of Advanced Science (SPSAS) – http://espca.fapesp.br/home

TABLE 15

BASIC AND APPLIED RESEARCH

Disbursement and new projects contracted in 2022 by major knowledge area

Programs	Life Sciences		Natural Sciences and Engineering		Human and Social Sciences		Interdisciplinary	
	Disbursement $ PPP	Projects contracted	Disbursement $ PPP	Projects contracted	Disbursement $ PPP	Projects contracted	Disbursement $ PPP	Projects contracted
Thematic and associated	62,639,461	621	40,806,188	608	5,962,770	152	472,398	16
Special projects and associated	0	0	767,059	11	0	1	0	0
RIDC and associated	6,813,001	130	9,337,543	127	1,786,885	35	18,382,150	2
YIG and associated	20,645,095	318	9,937,211	176	1,895,499	67	105,313	2
SPEC and associated	1,218,910	9	1,843,400	6	382,642	2	87,941	0
Regular Grants not associated to other grants	37,331,485	854	16,810,917	479	4,503,951	274	3,625,460	19
Total	**128,647,952**	**1,932**	**79,502,319**	**1,407**	**14,531,747**	**531**	**22,673,262**	**39**

THEMATIC PROJECTS

Goals: support for research projects with ambitious aims conducted by multidisciplinary teams for up to five years. Includes National Institutes of Science and Technology (NISTs), in partnership with the Ministry for Science, Technology and Innovation via the National Council for Scientific and Technological Development (CNPq).

TABLE 16

THEMATIC

Disbursement, number of active projects and new projects contracted in 2022

Fellowships ang Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Regular Grants – Thematic Projects	54,101,690	54	489
Research Grants – Regular	814,045	12	92
Research Grants – Participation in Scientific Meetings in Brazil	1,662	11	2
Research Grants – Participation in Scientific Meetings Abroad	96,861	2	10
Research Grants – Visiting Researcher from Brazil	175,979	7	6
Research Grants – Visiting Researcher from Abroad	455,541	26	20
Research Grants – Publication in Brazil	33,016	9	12
Research Grants – Publication Abroad	5,466	1	1
Regular Scholarships/Fellowships	40,244,423	838	2,453
Research Internships and Fellowships Abroad (RIA, RFA)	12,161,115	262	320
Fellowships – Technical Training	1,712,141	162	304
Fellowships – Science Journalism	43,817	5	7
Fellowships – Public Education	35,061	8	14
Total	**109,880,817**	**1,397**	**3,730**

SPECIAL PROJECTS

Goals: support for projects with significant scientific impact via participation in international consortia to assure access to high-cost next-generation equipment and technology for researchers in São Paulo State, such as participation in the Giant Magellan Telescope (GMT) to be built in the Chilean Andes.

PROJECTO GENERATION

Goals: support for promising early-career researchers, valorizing ambitious ideas and offering special medium-term funding conditions. A Generation fellowship is reserved for the principal investigator, who must work full-time on conducting the project.
A call for proposals was issued in 2022 to support research based on bold ideas proposed by researchers who graduated less than 11 years ago, earned a PhD less than six years before the submission deadline and are not gainfully employed when funding is contracted for.

TABLE 17

SPECIAL PROJECTS

Disbursement, number of active projects and new projects contracted in 2022

Fellowships ang Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grants – Special Projects	428,990	1	3
Regular Scholarships/Fellowships	67,948	2	5
Research Internships and Fellowships Abroad (RIA, RFA)	174,550	2	3
Fellowships – Technical Training	95,573	7	7
Total	**767,059**	**12**	**18**

Reducing childhood poverty could cut criminal convictions by almost a quarter

Researchers affiliated with the National Institute of Developmental Psychiatry (INPD), one of the National Institutes of Science and Technology (NISTs) supported by FAPESP and the National Council for Scientific and Technological Development (CNPq), interviewed 1,905 children twice in a period of seven years and analyzed 22 risk factors that can influence human development. An article on the study was published in *Scientific Reports*.

MEDICINE

FAPESP Process 2014/50917-0

INSTITUTION: Medical School, University of São Paulo (FM-USP)
PI: Eurípedes Constantino Miguel Filho

235 media outlets
agencia.fapesp.br/39958


Combate à pobreza na infância reduz risco de jovem cometer crime, diz pesquisa


O que pode reduzir o risco de um jovem cometer um crime?


NOTÍCIAS
Combate à pobreza na infância reduz em 22,5% os crimes na juventude


Combate à pobreza na infância reduz criminalidade, diz estudo

Risk of obesity is 45% higher among adolescents who consume ultraprocessed food

Based on data for 3,587 adolescents aged 12-19 who took part in the 2011-16 National Health and Nutrition Examination Survey (NHANES) in the United States, researchers at the University of São Paulo's School of Public Health (FSP-USP) calculated the impact of consuming ultraprocessed food products on the risk of obesity.

NUTRITION

FAPESP Process 2015/14900-9

INSTITUTION: FSP-USP
PI: Carlos Augusto Monteiro

750 media outlets
agencia.fapesp.br/38368


Risco de obesidade é 48% maior em adolescentes que comem ultraprocessados


Risco de obesidade é 45% maior entre adolescentes cuja dieta é baseada em ultraprocessados


Risco de obesidade é 45% maior entre adolescentes que comem muito ultraprocessados

MEDIA COVERAGE OF RESEARCH RESULTS: **THEMATIC PROJECTS**

Abuse of medications and full ICUs during pandemic to blame for outbreak of drug-resistant fungus, study shows

MEDICINE

FAPESP Process 2017/02203-7

INSTITUTION: EPM-UNIFESP
PI: Arnaldo Lopes Colombo

34 media outlets
agencia.fapesp.br/40165

A group of researchers at the Federal University of São Paulo's Medical School (EPM-UNIFESP) reported the largest outbreak to date of COVID-associated candidemia caused by a drug-resistant strain of *Candida parapsilosis*, a fungus that invades the bloodstream and can lead to death. The outbreak occurred in Salvador, Bahia, during the pandemic. An article on the study published in *Emerging Microbes & Infections* warned that other drug-resistant strains could emerge in future and stressed the importance of practices that help avoid fungal infections in hospitals.

Study identifies molecules associated with late-life depression

BIOCHEMISTRY

MS Scholarship associated to Regular Grant and Thematic Project
FAPESP Processes 2018/03422-7, 2017/25588-1

INSTITUTION: IB-UNICAMP
PI AND SUPERVISOR: Daniel Martins de Souza
GRANTEE Licia Carla da Silva Costa

438 media outlets
agenciabrasil.ebc.com.br/saude/noticia/2022-09/pesquisa-identifica-moleculas-associadas-depressao-em-idosos

Researchers at the State University of Campinas's Institute of Biology (IB-UNICAMP) conducted a study to find out whether proteins could be biological markers of geriatric depression, which affects over-65s with no prior history of the disease. An article in the *Journal of Proteomics* described how the study involving 50 subjects – 19 with geriatric depression and 31 as controls – found 75 substances that could be associated with the disorder.

RESEARCH, INNOVATION AND DISSEMINATION CENTERS (RIDC)

Goals: 17 centers of excellence that conduct basic or applied research focusing on specific issues for up to 11 years; active contributions to innovation via technology transfer; production of public policy input; extension activities for primary and secondary schools and the general public.

Eighteen new RIDCs will be selected by 2026 in six proposal submission cycles divided by major knowledge area. The first cycle selected three proposals in Life Sciences, Biological Sciences and Agricultural Engineering & Veterinary Medicine in 2020-21. Completion of proposal assessment will be announced in 2023. In the second cycle, preliminary proposals for three RIDCs in Human & Social Sciences, Architecture & Urbanism and Economics & Management were submitted by November 7, 2022, and those selected must be presented in full by May 17, 2023. Two more calls for proposals will be held to set up six RIDCs in Exact Sciences, Earth Sciences and Engineering (in 2023 and 2025); and six in Health Sciences, Biological Sciences and Agricultural Engineering & Veterinary Medicine (in 2024 and 2026).

TABLE 18

RIDC

Disbursement, number of active projects and new projects contracted in 2022

Fellowships ang Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grants – RIDC	21,633,052	0	17
Research Grants – Regular	59,506	3	14
Research Grants – Visiting Researcher	20,000	1	1
Research Grants – Visiting Researcher abroad	55,211	4	3
Research Grants – Participation in Scientific Meetings abroad	21,744	3	3
Regular Scholarships/Fellowships	9,946,236	171	564
Research Internships and Fellowships Abroad (RIA, RFA)	3,915,461	70	105
Fellowships – Technical Training	519,339	38	69
Fellowships – Science Journalism	149,030	4	9
Total	**36,319,579**	**294**	**785**

In 2022, 17 RIDCs selected in 2013 received support from FAPESP:

- Center for Research and Innovation in Biodiversity and Drug Discovery (CIBFar): USP – São Carlos
- Center for Research on Toxins, Immune Response and Cell Signaling (CeTICS): Butantan Institute – São Paulo
- Center for Cell-Based Therapy (CTC): USP – Ribeirão Preto
- Center for Research in Optics and Photonics (CEPOF): USP – São Carlos
- Center for Metropolitan Studies (CEM): USP – São Paulo
- Food Research Center (FoRC): USP – São Paulo
- Center for Research, Education and Innovation in Vitreous Materials (CeRTEV): UFSCar – São Carlos
- Center for Mathematical Sciences Applied to Industry (CeMEAI): USP – São Paulo
- Human Genome and Stem Cell Research Center (HUG-CEL): USP – São Paulo
- Brazilian Institute of Neuroscience and Neurotechnology (BRAINN): UNICAMP – Campinas
- Center for the Study of Violence (NEV): USP – São Paulo
- Obesity and Comorbidities Research Center (OCRC): UNICAMP – Campinas
- Center for Research on Inflammatory Diseases (CRID): USP – Ribeirão Preto
- Center for Research on Redox Processes in Biomedice: USP – São Paulo;
- Center for Computing in Engineering and Science (CCES): UNICAMP – Campinas
- Research, Innovation and Dissemination Center for Neuromathematics (NeuroMat): USP – São Paulo
- Functional Materials Development Center (CDMF): UFSCar – São Carlos.

In 2022

FAPESP launched a new site with information on these centers, news articles on research results, and announcements of opportunities for scholarships and fellowships.

www.cepid.fapesp.br/en

DISSEMINATION ACTIVITIES – RIDC 2022

Food Composition Table issued by FoRC serves as model for Latin America

The Brazilian Food Composition Table (TBCA), with nutritional and energy values for thousands of items, is constantly expanded and updated by the Food Research Center (FoRC), and has become a model for the creation or restructuring of food tables in other Latin American countries. For about two years, FoRC has helped provide courses to train nutritionists, food engineers and pharmaceutical scientists in this field.

agencia.fapesp.br/39701

Science and Art in Glass Exhibition

Produced by the Federal University of São Carlos (UFSCar) in honor of the International Year of Glass 2022, the exhibition Science and Art in Glass showcased 30 scientific and artistic glass pieces made by Ademir Sertori, the university's scientific glassblower, and technological glass objects that resulted from research by the Center for Research, Education and Innovation in Vitreous Materials (CERTEV).

agencia.fapesp.br/39129

A game to learn multiplication tables

Ludo Educativo, an educational games group linked to the Center for Development of Functional Materials (CDMF), relaunched the game TabuÁgua, which helps children aged 8-10 practice their times tables (visit **www.ludoeducativo.com.br/pt/play/tabuagua**). Created in partnership with Aptor Software, a CDMF spinoff, the game can be played by children on their own and used by teachers in the classroom.

agencia.fapesp.br/37769

CTC makes videos about cellular therapy, genetics and bioinformatics, among other research areas

The Center for Cell-Based Therapy (CTC) and the Ribeirão Preto Blood Bank produced a series of scientific diffusion videos entitled Por dentro da Pesquisa ("Inside Research"). They feature CTC's researchers in presentations and tutorials on cellular therapy, oncology, genetics, bioinformatics and hematology, among other areas. The videos were posted fortnightly on Fridays to CTC's social media and the Blood Bank's YouTube channel.

agencia.fapesp.br/39202

Podcast on living with Parkinson's

The Research, Innovation and Dissemination Center for Neuromathematics (NeuroMat) and Rede Amparo launched a podcast called Vivo com Parkinson ("I live with Parkinson's disease"). Available from the main audio platforms (including Spotify, Google Podcast, Deezer, Stitcher and Castbox), the podcast aims to enhance the quality of life for people with the disease, ranging beyond biological aspects by foregrounding individual life stories. Each episode focuses on a relatively little discussed topic, such as pregnancy, sex, prejudice and employment barriers. People from all over Brazil share experiences, and specialists comment on various aspects of Parkinson's.

agencia.fapesp.br/38136

Brazilian scientists create algorithm that detects fake news

A web platform facilitates the task of distinguishing between genuine and fake news. Using a combination of statistical models and machine learning techniques, the tool predicts the probability of content being false. Preliminary results showed that the system detected fake news with 96% accuracy. The platform was developed by researchers at the University of São Paulo's Institute of Mathematics and Computer Sciences (ICMC-USP) in São Carlos, linked to the Center for Mathematical Sciences Applied to Industry (CeMEAI).

MATHEMATICS

RIDC CeMEAI
FAPESP Process 2013/07375-0

INSTITUTION: ICMC-USP
PI: José Alberto Cuminato

241 media outlets
agencia.fapesp.br/38004

Edible, biodegradable, anti-microbial plastic boasts higher tensile strength than petroleum-based plastic

A material produced by researchers at São Paulo State University's Ilha Solteira School of Engineering (FEIS-UNESP) represents an important contribution to the production of "bioplastic" or "green plastic". Made from type B bovine gelatin easily found in retail stores in the form of a colorless powder, with clay and a nanoemulsion made from black pepper essential oil, the material will help reduce the use of fossil resources to produce plastic and contribute to the creation of biodegradable packaging. An article about it was co-authored by researchers affiliated with the Center for Development of Functional Materials (CDMF) and published in *Polymers*.

MATERIALS ENGINEERING AND METALLURGY

RIDC CDMF
FAPESP Processes 2019/06170-1, 2013/07296-2

INSTITUTIONS: FEIS-UNESP, Center for Exact Sciences & Technology, Federal University of São Carlos (CCET-UFSCar)
PI: Márcia Regina de Moura Aouada and Elson Longo da Silva

64 media outlets
agencia.fapesp.br/38077

MEDIA COVERAGE OF RESEARCH RESULTS: **RIDC**

Study presents novel therapeutic target for treatment of sepsis

PHARMACOLOGY

RIDC CRID
FAPESP Process 2013/08216-2

INSTITUTION: FMRP-USP
PI: Fernando de Queiroz Cunha

24 media outlets
agencia.fapesp.br/37678

A group at the Ribeirão Preto Medical School (FMRP-USP) linked to the Center for Research on Inflammatory Diseases (CRID) discovered that the protein gasdermin D is involved in septic patients' organ lesions. The study also proved that a drug originally indicated to treat alcohol dependence can inhibit the molecule's action and prevent complications. An article about the findings was published in the journal *Blood*.

A model that mimics malformation associated with severe epilepsy paves way to novel therapies

MEDICINE

RIDC BRAINN
FAPESP Process 2013/07559-3

INSTITUTION: FCM-UNICAMP
PI: Fernando Cendes

13 media outlets
agencia.fapesp.br/38196

In partnership with a group at the University of California San Diego (UCSD) in the United States, researchers at the State University of Campinas's Medical School (FCM-UNICAMP) and linked to the Brazilian Research Institute of Neuroscience and Neurotechnology (BRAINN) advanced knowledge of epilepsy by reprogramming skin cells from patients to differentiate into cortical organoids (3D cell cultures) with hallmarks of the focal cortical dysplasia, a malformation of the cerebral cortex associated with epilepsy. They also identified mechanisms that may be involved in the emergence of the anomaly during brain formation and obtained electrical readouts resembling the neuronal discharge typical of epileptic seizures in humans. An article on their findings was published in *Brain*, an Oxford Academic journal.

MEDIA COVERAGE OF RESEARCH RESULTS: **RIDC**

Experiments conducted by RIDC opens up new prospects for treatment of most lethal kind of skin cancer

MEDICINE

RIDC CTC
FAPESP Process 2013/08135-2

INSTITUTION: FMRP-USP
PI: Wilson Araújo da Silva Júnior

33 media outlets
agencia.fapesp.br/38675

Researchers at the Ribeirão Preto Medical School (FMRP-USP), linked to the Center for Cell-Based Therapy (CTC), conducted experiments that helped understand why patients with advanced-stage melanoma develop resistance to the drug vemurafenib.

Novel treatments are needed for parasitic worm diseases, experts warn

PARASITOLOGY AND BIOPHYSICS

RIDC CIBFar
FAPESP Processes 2020/01441-4, 2013/07600-3

INSTITUTIONS: UNG and IFSC-USP
PI: Josué de Moraes and Adriano Andricopulo

496 media outlets
agencia.fapesp.br/39049

Over a billion people in the world are infected by parasitic worms, but these are the neglected tropical diseases with the least treatment of all in terms of moving on from in vitro studies to preclinical and clinical trials, according to an article in *Drug Discovery Today* by researchers at the São Carlos Institute of Physics (IFSC-USP) and Guarulhos University (UnG) affiliated with the Center for Innovation in Biodiversity and Drug Discovery (CIBFar).

MEDIA COVERAGE OF RESEARCH RESULTS: **RIDC**

Group creates material that can be used to treat bone cancer

Researchers at the Federal University of São Carlos (UFSCar) produced a multifunctional composite made up of a bioactive glass matrix with magnetic particles for use in bone cancer hyperthermia. In hyperthermia, heat is used to help damage and kill cancer cells. In this innovation, heating of the area to be treated is controlled by a magnetic field, and the bioactive glass helps regenerate the bone. The research involved teams at UFSCar's Center for Exact Sciences and Technology (CCET), with links to the Center for Development of Functional Materials (CDMF) and the Center for Research, Education and Innovation in Vitreous Materials (CeRTEV).

METAL ENGINEERING AND METALLURGY

RIDC CeRTEV and CDMF
FAPESP Processes 2013/07296-2, 2013/07793-6

INSTITUTION: CCET-UFSCar
PI: Elson Longo da Silva and Edgard Dutra Zanotto

14 media outlets
agencia.fapesp.br/39763

Technique based on artificial intelligence detects Chagas disease using images taken with smartphone

Researchers at the Ribeirão Preto Medical School (FMRP-USP) and the Center for Research on Inflammatory Diseases (CRID) developed an algorithm to identify the protozoan *Trypanosoma cruzi* in photographs of blood samples taken with a mobile phone camera. The low-cost method is described in the journal PeerJ and can be reproduced.

PHARMACOLOGY

RIDC CRID
FAPESP Process 2013/08216-2

INSTITUTION: FMRP-USP
PI: Fernando de Queiroz Cunha

66 media outlets
agencia.fapesp.br/39202

YOUNG INVESTIGATOR GRANT (YIG)

Goals: attracting young PhDs from Brazil and other countries to create new research groups, and training new science leaders with the aim of building a scientific community of excellence in São Paulo State. Phase 2 of the program aims to consolidate research lines initiated by researchers who previously received support from the program and achieved excellence in their performance during the development of their projects. In 2022, FAPESP extended the maximum duration of YI scholarships from 48 to 60 months. This was one of several measures taken to attract new generations of scientists and stimulate the submission of more robust research proposals. The new rule is valid for new proposals submitted under the YI program, as well as proposals currently being analyzed and active projects. Also under the aegis of the YI program, FAPESP and Instituto Serrapilheira announced their first joint call for proposals in natural sciences, mathematics and computer science, to be submitted by researchers interested in seeking answers to major questions in their fields.

The opportunity corresponds to the 6th Serrapilheira Call for Proposals in Support of Young Scientists. This call involves partnerships with the National Council of State Research Agencies (CONFAP), FAPESP, and the research agencies for Rio de Janeiro (FAPERJ) and Santa Catarina (FAPESC).

TABLE 19

YOUNG INVESTIGATOR

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grants – YIG Phase 1	12,048,028	25	217
Research Grants – YIG Phase 2	4,232,114	26	74
Research Grants – YIG Phase 2 BIOEN	1,431	1	1
Research Grants – YIG Phase 2 BIOTA	462,755	0	4
Research Grants – Regular	376,427	8	37
Research Grants – Participation in Scientific Meetings abroad	9,208	2	2
Research Grants – Visiting Researcher	2,081	0	1
Research Grants – Visiting Researcher abroad	64,329	2	4
Research Grants – Publications	9,169	3	4
Young Investigators Fellowships	3,169,784	15	88
Regular Scholarships/Fellowships	9,241,760	327	833
Research Internships and Fellowships Abroad (RIA, RFA)	2,623,385	91	86
Fellowships – Technical Training	342,648	63	100
Total	**32,583,118**	**563**	**1,451**

SÃO PAULO EXCELLENCE CHAIR (SPEC)

Goals: support for high-level researchers based abroad to come to Brazil to set up research centers at universities in São Paulo State. They remain affiliated with their home institutions but undertake to stay in Brazil for 12 weeks per year for the duration of the project, which must last at least five years. They each coordinate a group of FAPESP scholarship awardees comprising postdoctoral researchers, PhDs, and scientific initiation students.

TABLE 20

SPEC

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grants – SPEC	2,174,001	3	15
Research Grants – Participation in Scientific Meetings abroad	11,827	1	1
Regular Scholarships/Fellowships	1,241,139	10	47
Bolsas Regulares no exterior	105,926	3	3
Total	**3,532,893**	**17**	**66**

MEDIA COVERAGE OF RESEARCH RESULTS: YOUNG INVESTIGATOR

Research pinpoints novel targets for development of male contraceptive

PHARMACOLOGY

FAPESP Process 2015/08227-0

INSTITUTION: IBB-UNESP, Botucatu
PI: Erick José Ramo da Silva

1,176 media outlets
agencia.fapesp.br/37934

Researchers at São Paulo State University's Institute of Biosciences (IB-UNESP) studied a protein present in sperm and discovered two novel targets that can be used in combination for the development of a male contraceptive.

Specialty and standard coffee beans can be sorted using multispectral imaging and artificial intelligence

AGRONOMY

FAPESP Process 2017/15220-7

INSTITUTIONS: CENA, ESALQ-USP and CIn-UFPE
PI: Clíssia Barboza da Silva

30 media outlets
agencia.fapesp.br/39466

A research group comprising scientists affiliated with the University of São Paulo's Center for Nuclear Energy in Agriculture (CENA) and Luiz de Queiroz College of Agriculture (ESALQ), collaborating with researchers at the Federal University of Pernambuco's Center for Computer Science (CIN-UFPE), developed a method of selecting coffee beans using multispectral imaging and machine learning. It does not require roasting, can be performed in real time and avoids human error in the assessment process, although it requires expensive equipment. An article about the method was published in the journal *Computers and Electronics in Agriculture*.

MEDIA COVERAGE OF RESEARCH RESULTS: YOUNG INVESTIGATOR

Scientists transform leftovers from beer production into biofuels

FOOD SCIENCE AND TECHNOLOGY

FAPESP Process 2018/14938-4

INSTITUTION: FEA-UNICAMP
PI: Tânia Forster Carneiro

48 media outlets
agencia.fapesp.br/39093

A group at the State University of Campinas's School of Food Engineering (FEA-UNICAMP) developed a method of treating the solid waste from breweries with ultrasound before submitting it to the process of digestion by microorganisms. The strategy obtains larger amounts of methane, which can be used by the brewery itself to generate electricity and heat. The final residue can be used as crop fertilizer.


Cientistas transformam sobra da produção da cerveja em biocombustíveis


pernambuco

Cientistas transformam sobra da produção da cerveja em biocombustíveis

MEDIA COVERAGE OF RESEARCH RESULTS: SPEC

Documentaries portray the Amazon's urgent problems through the eyes of the communities affected

ECOLOGY

FAPESP Process 2019/17113-9

INSTITUTION: Núcleo de Estudos e Pesquisas Ambientais (Nepam) da Unicamp
PI: Emilio Frederico Moran

10 media outlets
agencia.fapesp.br/39791

Researchers engaged in the project "After the hydropower complexes: social and environmental processes occurring after the construction of Belo Monte, Jirau and Santo Antônio in the Brazilian Amazon", supported by FAPESP under the aegis of its São Paulo Excellence Chair (SPEC) program, held a series of webinars entitled "The Amazon in images and movement: the stories of extractivism in the Amazon recorded by the lenses of Brazilian documentary makers" to discuss how intensive extraction of natural resources and the impact of huge hydropower complexes in the Amazon have been exposed in powerful documentaries disseminated at home and abroad.


Pará+

Filmes retratam problemas urgentes da Amazônia pelo olhar da população afetada


Filmes retratam problemas urgentes da Amazônia pelo olhar da população afetada


Filmes retratam problemas urgentes da Amazônia pelo olhar da população afetada

REGULAR GRANTS NOT ASSOCIATED TO OTHER GRANTS

The funding strategy Research for Knowledge Advancement also encompasses fast-track research projects supported by Regular Research Grants awarded in response to applications submitted spontaneously by researchers with doctoral degrees. This type of support is extended to individual projects (Research Grants – Regular), expenditure on visits by researchers from other parts of Brazil or other countries (Visiting Researcher Grants), organization of scientific meetings (Science Meeting Organization Grants), participation in scientific meetings in Brazil or abroad (Science Meeting Participation Grants), and books, articles and other publications in scientific journals reporting original research results (Publication Grants).

In 2022, FAPESP raised the monthly allowance granted to visiting researchers by about 20%. In the same period, it launched the Researchers at Risk Initiative, a call for proposals aimed at enabling research institutions in São Paulo State to host researchers from countries where their activities were exposed to risks, offering Visiting Researcher Grants and Postdoctoral Fellowships under a fast-track allocation totaling BRL 20 million. Proposals were analyzed according to a special emergency procedure lasting only a few days. Also in 2022, 111 projects were selected in the first call for Initial ΠΙ (Pi) Project Research Grants, a modality created in the previous year to support projects based on bold ideas in all knowledge areas for a five-year period. Projects were to have a budget of up to BRL 1 million and to be integrated with education and supervision initiatives for undergraduate and graduate students.

São Paulo School of Advanced Science (SPSAS)

SPSAS awards are a type of Regular Grant for Science Meeting Organization to support short courses for graduate students and postdocs from Brazil and elsewhere delivered by leading Brazilian and foreign scientists. In 2022, FAPESP issued the 16th call for SPSAS proposals after two years without calls owing to the mobility restrictions imposed to combat the COVID-19 pandemic.

ESCOLA SÃO PAULO DE CIÊNCIA AVANÇADA

TABLE 21

REGULAR GRANTS

Disbursement, number of active projects and new projects contracted in 2022

Research Grants not associated and Fellowships and Grants associated to them	Disbursement $ PPP	New projects contracted	Active projects
Research Grants – Regular	52,823,595	766	2,608
Research Grants – Participation in Scientific Meetings in Brazil	43,434	37	38
Research Grants – Participation in Scientific Meetings abroad	1,079,034	155	150
Research Grants – Organization of Scientific Meetings in Brazil and abroad	3,840,862	135	129
Research Grants – Publications in Brazil	572,100	156	279
Research Grants – Publications abroad	45,194	7	12
Research Grants – Visiting Researcher	390,516	7	12
Research Grants – Visiting Researcher abroad	448,107	31	24
Fellowships – Technical Training	1,728,542	310	545
Regular Scholarships/Fellowships	1,288,438	22	54
Fellowships – Technical Training (course abroad)	11,992	0	1
Total	**62,271,814**	**1,626**	**3,852**

Study opens up new possibilities for treatment of Pitt-Hopkins syndrome

BIOCHEMISTRY

FAPESP Process 2020/11451-7

INSTITUTIONS: IB-Unicamp and University of Califórnia San Diego
PI: Fabio Papes

386 media outlets
agencia.fapesp.br/39145

Researchers at the State University of Campinas's Biology Institute (IB-UNICAMP) and the University of California San Diego discovered the mechanism that causes this rare but severe autism spectrum disorder. They reversed progression of the syndrome in laboratory models, opening up new possibilities for treatment using drugs and gene therapy. An article about the research was published in *Nature Communications*.

Scientific study finds alcohol and drug use in 31% of trauma hospitalizations

INTERDISCIPLINARY

FAPESP Process 2017/20191-6

INSTITUTION: FM-USP
PI: Daniel Romero Muñoz

846 media outlets
agencia.fapesp.br/37791

A study conducted by researchers at the University of São Paulo's Medical School (FM-USP) found that 31.4% of trauma patients admitted to Hospital das Clínicas, Latin America's largest hospital complex, had consumed psychoactive substances. Alcohol had been used by 23%, cocaine by 12%, and marijuana by 5%. Traces of more than one drug were detected in 9% of the blood samples.

Researchers at the Oslo University Hospital in Norway collaborated. An article on the study was published in the journal *Injury*.

MEDIA COVERAGE OF RESEARCH RESULTS: **REGULAR GRANTS**

Gender influences the way people cope with alcohol dependence

COLLECTIVE HEALTH

FAPESP Process 2017/18535-9

INSTITUTION: EACH-USP
PI: Edemilson Antunes de Campos

479 media outlets
agencia.fapesp.br/38311

A qualitative study conducted by researchers at the University of São Paulo's School of Arts, Sciences and Humanities (EACH-USP) suggested that gender influences how people suffering from alcohol use disorder cope with their condition. Participants in women-only meetings of Alcoholics Anonymous expressed strong feelings of rejection and loneliness due to the social stigma attached to alcoholism in women. The findings were reported in an article published in *Drug and Alcohol Review.*

Oldest rocks in South America found in Bahia. Material is 3.65 billion years old

GEOSCIENCES

FAPESP Process 2018/25465-0

INSTITUTION: IG-Unicamp
PI: Elson Paiva de Oliveira

27 media outlets
https://revistapesquisa.fapesp.br/en/oldest-rocks-in-south-america-found-in-bahia

A group of researchers at the State University of Campinas's Geoscience Institute (IG-UNICAMP) unearthed the oldest rocks ever found in South America. The discovery was made in Piritiba, a municipality in the Chapada Diamantina region of Bahia State. At 3.65 billion years old, the rocks date from the Eoarchean, the first era in which the Earth had a solid crust, spanning the period between 4 billion and 3.6 billion years ago. When these rocks were formed, the Earth was less than 1 billion years old and the first forms of life were beginning to emerge. According to the researchers, finding such ancient geological samples in a tropical region of Brazil was almost a miracle.

RESEARCH FOR INNOVATION

FAPESP runs a number of research programs that promote collaboration between companies and universities or research institutions to stimulate the development of technological innovation in São Paulo State. As part of this strategy, FAPESP is supporting a study to establish conceptual and operational parameters for the creation of Innovation and Creativity Districts in São Paulo and Campinas.

In 2022

$ PPP 38.6 million

1,518 collaborative research projects – universities and companies

724 new projects.

RELATED PROGRAMS

Engineering Research Centers (ERCs)/Applied Research Centers (ARCs) – www.fapesp.br/cpe/home
Research Partnership for Technological Innovation Program (PITE) – www.fapesp.br/en/12050
Innovative Research in Small Business Program (PIPE)
Intellectual Property Support Program (PAPI-Nuplitec)
Innovation Districts

TABLE 22

RESEARCH FOR INNOVATION

Disbursement (in $ PPP) and number of new projects contracted for as research in partnership with companies in 2022, by major knowledge area

Programs	Life Sciences		Natural Sciences and Engineering		Human and Social Sciences		Interdisciplinary	
	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted
ERC/ARC and associated	2,950,103	34	5,843,100	81	135,019	6	1,717,958	3
PITE and associated	1,042,104	2	1,194,418	17	0	0	0	1
PIPE and associated	9,372,205	243	10,705,476	264	1,073,766	30	1,835,858	41
Intellectual Property and associated	0	0	2	0	209,512	1	39,010	1
Innovation Districts	0	0	0	0	0	0	2,477,550	0
Total	**13,364,412**	**279**	**17,742,997**	**362**	**1,418,297**	**37**	**6,070,376**	**46**

ENGINEERING RESEARCH CENTERS/ APPLIED RESEARCH CENTERS (ERCs/ARCs)

ERCs and ARCs operate in accordance with an innovative collaborative research model: they enable companies' research teams to conduct effective collaboration with a university or research institution for a long period (five to ten years), creating shared knowledge in areas of common interest with significant potential for application of results. Research projects are co-funded by FAPESP and partner companies. Host institutions are responsible for operating costs and salaries.

IN 2022

$ PPP 10.6 million to fund 280 280 research projects under the auspices of 24 ERCs/ARCs established in partnership with companies, social organizations and academic institutions.

124 new projects contracted for.

TABLE 23

ERC/ARC

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Grants ERC/ARC	5,205,968	7	24
Research Grants – Regular	31,835	2	7
Research Grants – Multiuser Equipment	1,582,359	3	18
Research Grants – Participation in Scientific Meetings	33,557	4	4
Research Grants – Visiting Researcher Abroad	41,245	2	2
Regular Scholarships/Fellowships	2,800,505	72	174
Research Internships and Fellowships Abroad	786,673	17	20
Fellowships – Technical Training	164,037	17	31
Total	**10,646,179**	**124**	**280**

Three ERCs established in 2021 and 2022, began operating in 2022:

- **Shell Brazil-FAPESP Offshore Innovation Center (OIC):** the third ERC set up in partnership with Shell;
- **Center for Plant Molecular Improvement:** partnership with EMBRAPA hosted by the State University of Campinas's Center for Molecular Biology and Genetic Engineering (CBMEG-UNICAMP);
- **Center for Research in Immuno-Oncology (CRIO):** established in 2021 with GSK and hosted by the Albert Einstein Jewish-Brazilian Institute for Education and Research (IIEP).

Three other ERCs, set up in 2022 began work on research projects in 2023:

- **Smart Networks and Services for 2030 ERC (Smartness):** established by FAPESP and Ericsson at UNICAMP;
- **Plasticulture Research Center:** partnership with Braskem staffed by researchers linked to UNICAMP's Interdisciplinary Hub for Energy Planning (NIPE) and several other universities and research institutions in São Paulo State;
- **ERC for Aerial Mobility of the Future (ERC-AMF):** partnership with Embraer hosted by the Aeronautical Technology Institute (ITA).

Four ARCs in artificial intelligence selected in 2022, involving partnerships between FAPESP, the Ministry for Science, Technology, Innovation and Communications (MCTIC) and the Brazilian Internet Steering Committee (CGI.br), began conducting research in 2023:

- **ARC in Artificial Intelligence for the Evolution of Manufacturing to Industry 4.0:** hosted by the Technological Research Institute (IPT);
- **Reference Center in Artificial Intelligence (CeReIA):** hosted by the Federal University of Ceará (UFC);
- **Artificial Intelligence Recreating Environments (IARA):** hosted by the University of São Paulo's Institute of Mathematics and Computer Science (ICMC-USP) in São Carlos;
- **Center of Excellence in Applied Research on Artificial Intelligence for Industry:** hosted by SENAI Cimatec in Bahia.

24 ERCS AND ARCS SET UP BY 2022

1. **FAPESP Process 2013/50238-3:** ERC set up to develop biofuel combustion engines, a partnership with Peugeot Citroën hosted by the State University of Campinas's School of Mechanical Engineering (FEM-UNICAMP);
2. **FAPESP Process 2014/50249-8:** Center of Excellence for Research on Sustainable Chemistry (CERSusChem), a partnership with GSK hosted by the Federal University of São Carlos (UFSCar);
3. **FAPESP Process 2014/50279-4:** ERC for Innovation in Natural Gas, a partnership with Shell hosted by the University of São Paulo's Engineering School (POLI-USP);
4. **FAPESP Process 2020/15230-5:** Research Center for Greenhouse Gas Innovation (RCGI), a partnership with Shell hosted by POLI-USP;
5. **FAPESP Process 2015/50040-4:** Center of Excellence for New Molecular Target Discovery (CENTD), a partnership with GSK hosted by Butantan Institute;
6. **FAPESP Process 2020/13139-0:** Center of Excellence for New Target Discovery, a partnership with GSK hosted by Butantan Institute;
7. **FAPESP Process 2016/23218-0:** Genomics for Climate Change Research Center (GCCRC), a partnership with EMBRAPA hosted by UNICAMP;
8. **FAPESP Process 2017/11958-1:** Center for Innovation in New Energies (CINE), a partnership with Shell with four research divisions – Advanced Energy Storage and Dense Energy Carriers hosted by UNICAMP; Materials Science and Computational Chemistry hosted by USP; and Sustainable Route for Conversion of Methane with Advanced Chemical Technologies hosted by IPEN;
9. **FAPESP Process 2017/15736-3:** Energy Production Innovation Center (EPIC), a partnership with Equinor (formerly Statoil) hosted by FEM-UNICAMP;
10. **FAPESP Process 2017/25258-1:** Sugarcane Plant Health Research Center, a partnership with Grupo São Martinho hosted by São Paulo State University's School of Agricultural and Veterinary Sciences (FCAV-UNESP) in Jaboticabal;

11 **FAPESP Process 2018/02317-5:** São Paulo Advanced Research Center for Biological Control (CBIO), a partnership with Koppert hosted by the University of São Paulo's Luiz de Queiroz College of Agriculture (ESALQ-USP);

12 **FAPESP Process 2019/07665-4:** ERC in Artificial Intelligence (C4AI), a partnership with IBM hosted by USP;

13 **FAPESP Process 2019/12553-0:** Brazilian Center for Applied Research on Early Childhood (CPAPI): a partnership with Maria Cecília Souto Vidigal Foundation hosted by INSPER in São Paulo;

14 **FAPESP Process 2021/00408-6:** Center for Research in Immuno-Oncology (CRIO), a partnership with GSK hosted by the Albert Einstein Jewish-Brazilian Institute for Education and Research (IIEP);

15 **FAPESP Process 2021/00199-8:** Smart Networks and Services for 2030 ERC (Smartness), a partnership with Ericsson hosted by UNICAMP;

16 **FAPESP Process 2021/05251-8:** Plasticulture Research Center, a partnership with Braskem hosted by UNICAMP's Interdisciplinary Hub for Energy Planning (NIPE);

17 **FAPESP Process 2022/03698-8:** Shell Brazil-FAPESP Offshore Innovation Center (OIC), a partnership with Shell hosted by POLI-USP;

18 **FAPESP Process 2022/04006-2:** Center for Plant Molecular Improvement, a partnership with EMBRAPA hosted by UNICAMP's Center for Molecular Biology and Genetic Engineering (CBMEG);

19 **FAPESP Process 2020/09866-4:** Center for Innovation in Artificial Intelligence for Health (CIIA-Saúde) hosted by the Institute of Exact Sciences at the Federal University of Minas Gerais (ICEx-UFMG);

20 **FAPESP Process 2020/09838-0:** Brazilian Institute of Data Science (BIOS) hosted by UNICAMP's School of Electrical and Computer Engineering (FEEC);

21 **FAPESP Process 2020/09706-7:** Reference Center in Artificial Intelligence (CeReIA) hosted by the Federal University of Ceará (UFC), and partnering with three Institutes of Science and Technology (ICTs): Pontifical Catholic University of Rio de Janeiro (PUC-RJ), Federal University of Piauí (UFPI) and University of Fortaleza (UNIFOR);

22 **FAPESP Process 2020/09850-0:** ARC in Artificial Intelligence for the Evolution of Manufacturing to Industry 4.0 hosted by the Technological Research Institute (IPT) in São Paulo;

23 **FAPESP Process 2020/09835-1:** Artificial Intelligence Recreating Environments (IARA) hosted by University of São Paulo's Institute of Mathematical and Computer Sciences (ICMC-USP);

24 **FAPESP Process 2020/09770-7:** Center of Excellence in Applied Research in Artificial Intelligence for Industry hosted by SENAI Cimatec in Bahia.

The ARC on Wellbeing and Human Behavior, a partnership with Natura and USP's Psychology Institute (IP), completed its term and was wound up.

ERC/ARC INITIATIVES IN 2022

1. Studies on carbon storage supported by FAPESP contribute to legislative proposal

Results of studies conducted at the Research Center for Greenhouse Gas Innovation (RCGI) have fed into a bill before the Senate to set up a legal framework on carbon capture and storage as an economic activity.

agencia.fapesp.br/39091

2. Tool uses artificial intelligence to help combat hunger

Algorithms developed by researchers at the ERC in Artificial Intelligence (C4AI) analyze and interpret data from hundreds of databases to determine which areas of a given city lack infrastructure and adequate options for food supply. The innovation is intended to show where government, companies and other organizations should act in order to make more precise and efficient decisions in combating food insecurity.

agencia.fapesp.br/44959

3. New research center at UNICAMP will help Brazil prepare for 6G internet

The mission of the Smart Networks and Services for 2030 ERC (Smartness) established by FAPESP and Ericsson at the State University of Campinas (UNICAMP) is to develop innovative telecommunications solutions that help design and build cloud computing infrastructure and cognitive networks guided by machine learning and artificial intelligence for 5G and 6G connectivity services.

agencia.fapesp.br/40268

4. Video on drought-tolerant crop varieties aims to draw attention to global climate change

In 2022, the Genomics for Climate Change Research Center (GCCRC) launched a video with an animated film entitled *Do gene ao campo* ("From genetics to agriculture") to mark National Climate Change Awareness Day. The film shows how research on the genomics of plants and microorganisms in Brazilian biodiversity can inspire production of novel crop varieties capable of withstanding the adverse effects of climate change, especially drought. The video can be watched at: youtu.be/th38bN2Khp8.

agencia.fapesp.br/38147

5. Book assembles studies on use of nanomaterials to convert CO2 into fuels and other chemicals

Published by the Royal Society of Chemistry,the book *2D Nanomaterials for CO_2 Conversion into Chemicals and Fuels* presents 16 chapters with a set of studies on opportunities to use 2D nanomaterials for electrochemical reduction of CO_2, highlighting the unique properties and many applications of these materials. The book is intended for academic and industrial researchers, who are increasingly interested in understanding the functionality of 2D nanocomposites. One of the chapters, entitled "Photoelectrochemical CO_2 conversion through the utilization of non-oxide two-dimensional nanomaterials", was written by four Brazilian researchers affiliated with the Center for Development of Functional Materials (CDMF) and the Center for Innovation in New Energies (CINE).

agencia.fapesp.br/39794

MEDIA COVERAGE OF RESEARCH RESULTS: **ERC/ARC**

Group studies how to transform organic molecules into electricity, fuel and industrial raw materials

CHEMISTRY

FAPESP Process 2017/11986-5

ERC CINE
Grupo Shell and UNICAMP
PI: Ana Flávia Nogueira

11 media outlets
agencia.fapesp.br/38285

Researchers at CINE and collaborators used a type of electrochemical reaction called electro-oxidation to promote the transformation of organic molecules such as glycerol and methanol, and to produce hydrogen, electricity and other substances that can serve as raw materials for industry.

Researchers study sustainable production of plastic without using petroleum products

INTERDISCIPLINARY

FAPESP Process 2020/15230-5

ERC RCGI
Grupo Shell and USP
PI: Julio Romano Meneghini

13 media outlets
agencia.fapesp.br/40323

Producing plastic and other polymeric materials without deriving them from petroleum is the aim of the project "Integrating CO_2 and ethanol chemistry to prepare biobased polyurethane", conducted at RCGI.

MEDIA COVERAGE OF RESEARCH RESULTS: ERC/ARC

Artificial intelligence enhances forecasting of ocean conditions in port areas

COMPUTER SCIENCE

FAPESP Process 2019/07665-4

C4AI
IBM and University of São Paulo's Innovation Center (Inova-USP)
PI: Fabio Gagliardi Cozman

2 media outlets
agencia.fapesp.br/44927

Researchers at the Center for Artificial Intelligence (C4AI) developed algorithms to forecast weather patterns and ocean conditions with 20% higher accuracy than conventional methods. The technology is being tested at the Port of Santos.

Scientists develop battery based on element found in abundance on Earth

CHEMISTRY

FAPESP Process 2017/11986-5

ERC CINE
Grupo Shell and UNICAMP
PI: Ana Flávia Nogueira

8 media outlets
agencia.fapesp.br/40221

Researchers at CINE and collaborators developed a material capable of improving the performance of batteries and supercapacitors based on sodium ions, an alternative to the widely used technology based on lithium ions.

RESEARCH PARTNERSHIP FOR TECHNOLOGICAL INNOVATION PROGRAM (PITE)

PITE supports scientific and technological research projects conducted at universities or research institutions in São Paulo State in cooperation with researchers at companies in Brazil or abroad.

Research proposals can be submitted at any time (PITE Spontaneous Demand) or in response to calls issued under the aegis of cooperation agreements between FAPESP and partner companies interested in solutions to challenges facing the companies, an industry or an economic sector (PITE Agreements).

The rules were changed in 2022 so that research institutions' personnel costs can be covered by partner companies. The purpose of the change was to remove the constraints on allocation of funding to project teams under the program and make budget execution more flexible.

IN 2022

$ PPP 2.3 million to support 72 research projects conducted in partnership by companies and universities or research institutions.

20 new projects.

IN 2022

- **PITE Agreements – Six companies with 52 active projects and 17 new projects contracted for:**

  Agilent, Embraer (under the aegis of a cooperation agreement with the European Union – Horizon 2020), Empresa Brasileira de Pesquisa e Inovação (Embrapii), Kryptus Segurança da Informação Ltda. (via an agreement with MCTI/CGI.br), Microsoft and SABESP.

  Nine other companies with active agreements did not have ongoing projects in 2022: Andaraguá, BP Biocombustíveis, Braskem, Citrosuco, Copag, Biominas Brasil, IBM Brazil, Natura and Solvay.

- **PITE Spontaneous Demand – 11 companies with 20 active projects and 3 new projects contracted for:**

  Companhia Brasileira de Metalurgia e Mineração, bioMérieux Brasil S.A., EMS S.A., Infibra S.A., Laboratório BioVet S.A., Maiz Indústria e Comércio de Produtos Agropecuários Ltda., Medicines for Malaria Venture, Cetesb, and three non-mapped units, of which two in partnership with UNESP in São João da Boa Vista, and one with USP in Lorena.

TABLE 24

PITE

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grants associated	Disbursement $ PPP	New project contracted	Active project
Research Grants – PITE	1,611,316	3	31
Research Grants – Multiuser Equipment	0	0	2
Regular Scholarships/Fellowships	542,256	15	32
Research Internships and Fellowships Abroad (RIA, RFA)	18,281	0	1
Fellowships – Technical Training	64,669	2	6
Total	**2,236,522**	**20**	**72**

INNOVATIVE RESEARCH IN SMALL BUSINESS PROGRAM (PIPE)

PIPE supports entrepreneurs who want to convert knowledge into novel products or services. Applications for funding can be submitted at any time. Proof-of-concept testing is Phase 1, project development proper is Phase 2, and industrial and commercial development is Phase 3.

FAPESP gives entrepreneurs selected in Phase 1 an opportunity to enhance their business plans and align projects with market demand, increasing their chances of success, via the PIPE High Tech Entrepreneurship Training Program (PIPE Entrepreneur).

PIPE Invest allocates supplementary funds to startups and small and medium enterprises that have begun developing innovative processes or products with PIPE's support, have strong success potential and already have an interested investor. The aim is to enhance the technology and accelerate market insertion of the innovation.

Through an agreement with FINEP, the Brazilian government's innovation agency (PIPE-PAPPE Grants), FAPESP also supports industrial and commercial development of innovative products (Phase 3). In 2022, 12 projects were selected in the ninth round of the program, launched in 2021, and seven in the tenth round, announced in 2022.

PIPE Knowledge Transfer (PIPE-TC) supports scientific or technological research in small enterprises via projects conducted in partnership with researchers at universities and research institutions.

Six virtual meetings were held during the year as part of FAPESP's Dialogue on Support for Innovative Research by Small Business, an opportunity for entrepreneurs to understand how it supports the various stages of innovative initiatives.

IN 2022

Investiment of $ PPP 23.0 million in 1,157 research projects.

PIPE contracted for 578 research projects by 224 innovative small enterprises – 220 projects by 90 newly supported companies.

Since the program's inception in 1997, FAPESP has awarded 3,491 PIPE grants to 1,853 companies in 163 cities in São Paulo State.

TABLE 25

PIPE

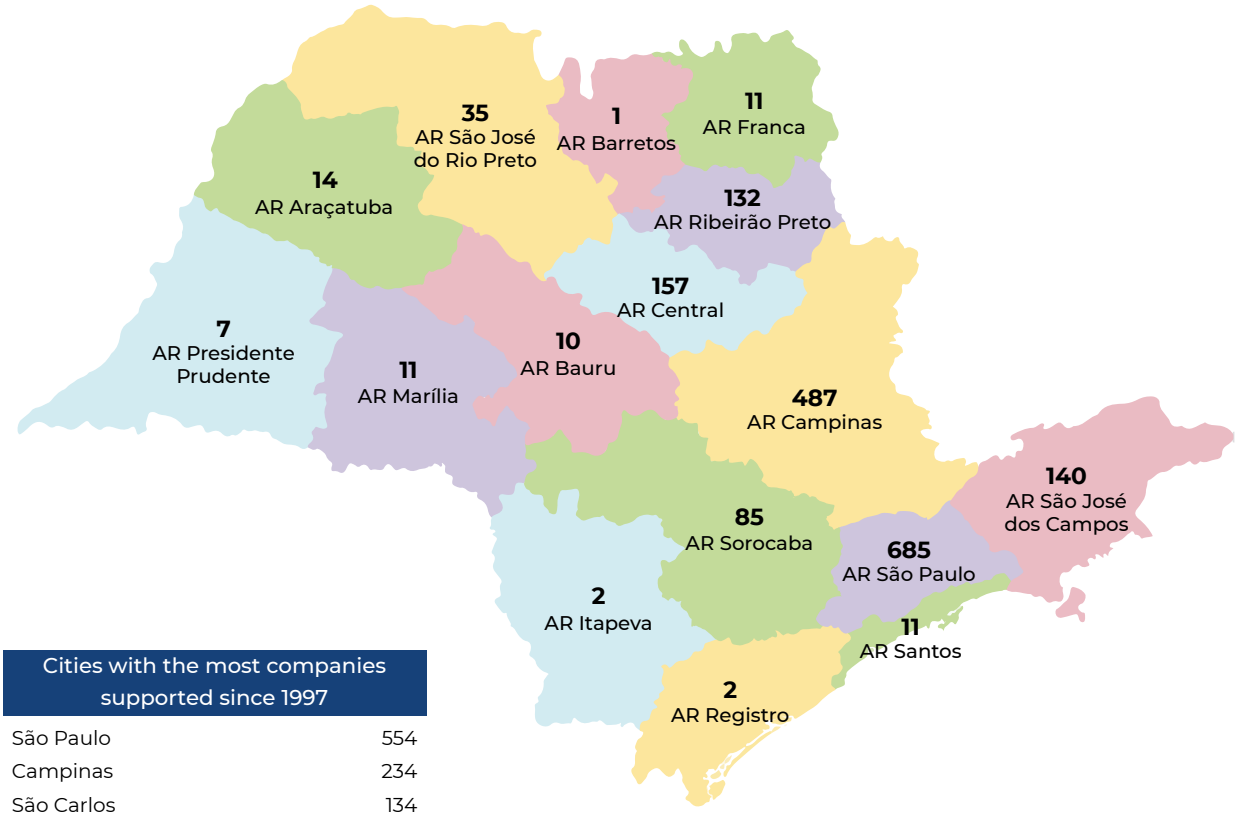
Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grants – PIPE	14,776,239	207	479
Research Grants – Visiting Researcher	1,596	0	1
Fellowship – Research in Small Business (PE)	5,160,795	122	240
Regular Scholarships/Fellowships	3,599	1	1
Fellowships – Technical Trainning	3,045,078	248	436
Total	**22,987,306**	**578**	**1.157**

CHART 5

GEOGRAPHY OF INNOVATION IN SÃO PAULO STATE – 2022

Companies supported by PIPE in Administrative Regions (AR) of São Paulo – since 1997*



Cities with the most companies supported since 1997	
São Paulo	554
Campinas	234
São Carlos	134
São José dos Campos	120
Ribeirão Preto	95
Piracicaba	65
Botucatu	31
Sorocaba	29
Araraquara	21
São José do Rio Preto	21
Jaboticabal	27
Santana de Parnaíba	16
Indaiatuba	16
Jundiaí	15
Limeira	13
Valinhos	13
Santo André	13
São Bernardo do Campo	13
Cotia	12
Pirassununga	12
São Caetano do Sul	12

PIPE INITIATIVES IN 2021

PIPE Simplified

FAPESP created a pilot initiative to simplify presentation of research proposals for Phase 1 of PIPE. In the new format, proposals must have up to 22 pages, including résumés of the project team and any consultants to be subcontracted, and not counting the bibliography.

PIPE-TC call

FAPESP issued a call for proposals under PIPE-TC on matters of interest to BIOTA (FAPESP Research Program on Biodiversity Characterization, Conservation, Restoration and Sustainable Use), BIOEN (FAPESP Bioenergy Research Program) and RPGCC (FAPESP Research Program on Global Climate Change).

PIPE-SABESP call

In the period, FAPESP and the São Paulo State Basic Sanitation Corporation (SABESP) issued the fourth call for proposals since their partnership began and their first joint call to support PIPE projects. Proposals must involve the development of basic sanitation products or processes, including prototypes and demonstrations in the operating environment, with significant improvements in water supply and sewerage efficiency, service quality, infrastructure and facilities.

PIPE-SEBRAE SP call: from research to the market

Eight proposals were selected in the second call under the agreement signed in 2021 between FAPESP and SEBRAE to support PIPE Phase 2 projects.

CENTELHA

São Paulo State, via FAPESP, joined the second edition of Centelha (Spark), an initiative of the Ministry of Science, Technology and Innovation (MCTI) and the Brazilian Innovation Agency (FINEP), implemented in 26 states in partnership with the National Council for Scientific and Technological Development (CNPq), the National Council of State Research Support Foundations (CONFAP), and CERTI Foundation.

The call received 571 applications for funding to develop innovative research. At the end of the process in 2022, the top 50 proposals were selected. FAPESP and FINEP will allocate $ PPP 31,000, and projects may be eligible for PIPE funding at a later stage.

FINEP – TECNOVA II

FAPESP announced the results of the second round of the program, which supports the development of innovative products and processes by companies that strengthen economic sectors considered strategic by federal government policies and that comply with innovation policy in São Paulo State.

Three proposals were selected: creation of a chest vibration machine for bronchial hygiene; development of a respiratory filter with silver nanoparticles for prevention and mitigation of the risk of infection by bacteria, fungi and viruses while patients are on mechanical ventilation (in intensive care units and operating theaters); and production of a multifunctional machine to make popsicles.

MEDIA COVERAGE OF RESEARCH RESULTS: **PIPE**

Flame-retardant coating stops even wood from catching fire

CHEMISTRY

FAPESP Process 2018/00834-2

COMPANY: GG & FG Consultores Associados Ltda.
PI: Fernando Galembeck

261 media outlets

pesquisaparainovacao.fapesp.br/2238

Galembetech, a startup based in Campinas, developed a novel flame-retarding material via an innovative strategy based on the use of cellulose fibers to reassemble graphite crystals. The nanotechnological product, developed with support from PIPE, is being used in the manufacturing of coatings that prevent fire from spreading on wood surfaces and buildings, among other applications.

Algorithms and sensors aid soil mapping and optimization of agricultural production

AGRONOMY

FAPESP Process 2018/08555-5

COMPANY: Cropman Inovação Tecnológica e Agricultura Digital Ltda.
PI: Henrique Coutinho Junqueira Franco

27 media outlets

pesquisaparainovacao.fapesp.br/2129

Cropman, a startup in Campinas, developed a high-precision low-cost soil diagnostic technology called Smart Sampling based on the use of multiple field sensors, with information flow automation and algorithm-driven data mining.

MEDIA COVERAGE OF RESEARCH RESULTS: PIPE

Startup uses eggshells as raw material for next-generation dermal filler

INTERDISCIPLINARY

FAPESP Process 2020/01428-8

COMPANY: Biosmart Nanotechnology Ltda.
PI: Hélida Gomes de Oliveira Barud
Agreement with the National Research Council of Canada

49 media outlets

pesquisaparainovacao.fapesp.br/2075

Dermal filling involving facial injections of hyaluronic acid is a widely used procedure to treat wrinkles, scars and skin grooves, with a global market projected to reach USD 9.4 billion by 2028. An innovation developed by the startup Biosmart Nanotechnology involves extraction of high-purity hyaluronic acid from eggshells as a raw material for the production of a novel dermal gel.

Startup develops sparkling beverage from honey produced by Brazilian native bees

FOOD SCIENCE AND TECHNOLOGY

FAPESP Process 2019/09109-1

COMPANY: Mirá Pesquisa e Desenvolvimento Ltda.
PI: Juliana Massimino Feres

15 media outlets

pesquisaparainovacao.fapesp.br/2501

Mirá, a startup in São Carlos, São Paulo State, is developing a premium sparkling beverage from honey produced by native stingless bees. The project aims to encourage conservation of wildlife and valorize the culture and craftsmanship of local producers.

MEDIA COVERAGE OF RESEARCH RESULTS: **PIPE**

Computational solution automatically identifies alterations in mammograms

BIOMEDICAL ENGINEERING

FAPESP Process 2017/18535-9

EMPRESA: Harpia Health Solutions Ltda.
PI: Daniel Aparecido Vital

16 media outlets

pesquisaparainovacao.fapesp.br/2335

Harpia Health Solutions created an innovative computational method called Delfos Platform that enables radiologists to use a faster, simpler and more accurate method of analyzing mammograms in search of suspect breast alterations. The technology identifies and automatically classifies breast tissue anomalies and lesions in mammograms, facilitating the screening process conducted by radiologists.

Toll tag technology is repurposed for use in wildlife monitoring

ECOLOGY

FAPESP Processes 2005/50843-8, 2006/51238-3

COMPANY: Marco Antonio Marques de Souza
PI: Sonia Cristina da Silva Belentani

13 media outlets

pesquisaparainovacao.fapesp.br/2415

Trapa-Câmera, a São Paulo-based startup, is developing a new telemetry system that will offer a handy alternative for monitoring wild animals. The system is based on a similar technology to the windscreen tag used by drivers to pay road tolls and parking fees remotely.

INTELLECTUAL PROPERTY POLICY

FAPESP's new intellectual property policy guidelines, altered by Ordinance no. 77 on February 17, 2022, govern the assignment of IP rights and income relating to creations originating in its funding programs. The intellectual property policy can be read in Portuguese at fapesp.br/pi.

In 2022, FAPESP allocated $ PPP 248,500 to projects contracted for in previous years and still active under the PAPI/Nuplitec program, which was established in May 2000 to support protection and licensing of IP rights to the results of research funded by FAPESP.

PATENT APPLICATIONS OF INTEREST TO FAPESP

Between 1982 and 2022, 1,756 patent applications directly promoted by FAPESP or arising from research supported by it were filed with Brazil's National Industrial Property Institute (INPI) or other patent offices.

TABLE 26

INTELLECTUAL PROPERTY

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grants associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grant – PAPI/Nuplitec	241,260	0	6
Fellowships – Technical Training	7,265	2	3
Total	**248,525**	**2**	**9**

CHART 6

PATENTS APPLICATIONS FILED – 1982-2022
PAPI/NUPLITEC PROGRAM ESTABLISHED

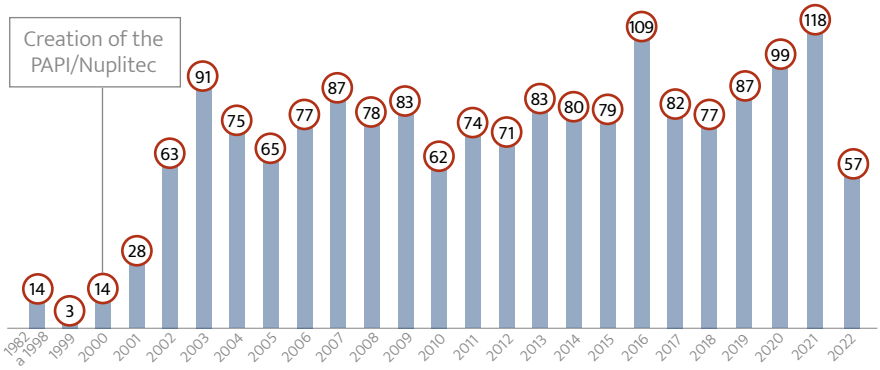


TABLE 27

NUMBER OF PATENT APPLICATIONS FILED – 1982-2022

Top 10 institutions by n° of patent applications

Institution	Number
Unicamp	543
USP	508
Unesp	181
Instituto Butantan	93
UFSCar	115
Unifesp	44
UFABC	22
IPT	20
Unian	15
Unifran	15
UMC	14
Fundação Pio XII	5
CNEN	5
INPE	6
IAC	4
Incor	3
Fealq	3

TABLE 28

NUMBER OF PATENT APPLICATIONS FILED – 1982-2022

By knowledge area

Knowledge area	Number
Life Sciences	775
Natural Sciences and Engineering	766
Human and Social Sciences	8
Interdisciplinary	7
Not identified	200
Total	**1.756**

INNOVATION DISTRICTS

Researchers at FIPE, an economics think tank, are conducting a feasibility study on the creation in São Paulo State of Innovation Districts as planned areas designed to foster innovation located near universities and research institutions, and containing high-tech companies, startup incubators and accelerators. The study began by analyzing the current site of the CEAGESP wholesale market in São Paulo City and will be extended to other areas along the Pinheiros River and near the University of São Paulo (USP), Butantan Institute, the Technological Research Institute (IPT) and the Nuclear and Energy Research Institute (IPEN), among others.

RESEARCH ON STRATEGIC THEMES

This funding line covers a group of programs through which FAPESP seeks to encourage research projects on topics considered strategic to the development of São Paulo State and Brazil, and includes support for the institutional development plan for research institutions in the state and support for Science for Development Centers.

In 2022

$ PPP 33.5 million
1,185 active projects.
10 programs.
496 new projects.

RELATED PROGRAMS

FAPESP Research Program on Biodiversity (BIOTA) – fapesp.br/en/biota
FAPESP Bioenergy Research Program (BIOEN) – fapesp.br/en/bioen
FAPESP Research Program on Global Climate Change – fapesp.br/pfpmcg
Research on Public Policies Program (PPP) – fapesp.br/politicaspublicas
Research on Public Policies for the SUS (PP-SUS) – fapesp.br/ppsus
Public Education Research Program – fapesp.br/46
Science Journalism (MídiaCiência) – fapesp.br/jornalismocientifico
FAPESP Research Program on eScience&Data Science – fapesp.br/en/escience
Institutional Development Plan for Research Institutions in São Paulo State (PDIp) – fapesp.br/11414
Science for Development Centers (SDC-SP) – fapesp.br/14936

TABLE 29
RESEARCH ON STRATEGIC THEMES

Disbursement and new projects contracted for in 2022, by major knowledge area

Programs	Life Sciences		Natural Sciences and Engineering		Human and Social Sciences		Interdisciplinary	
	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted	Disbursement $ PPP	New projects contracted
BIOTA and associated	5,809,771	117	903,750	10	254,723	3	317,203	2
BIOEN and associated	2,153,516	36	1,830,575	20	22,738	0	51,079	5
Global Climate Change and associated	1,986,580	26	5,412,399	40	509,454	14	178,296	3
Research on Public Policies and associated	3,785,518	19	53,780	0	472,315	70	40,102	5
eScience & Data Science and associated	343,497	6	215,373	3	0	0	0	0
Science Journalism not associated	17,897	1	0	4	71,219	0	29,380	2
PDIp and associated	4,905,561	41	2,307,169	15	63,248	1	0	0
SDC-SP and associated	1,431,649	30	264,559	16	2,297	3	34,555	4
Total	**20,433,988**	**276**	**10,987,603**	**108**	**1,395,994**	**91**	**650,616**	**21**

BIOTA-FAPESP

Goals: mapping, cataloguing and characterizing biodiversity in São Paulo State; defining mechanisms of conservation, restoration and assessment.

In 2022, a call for proposals entitled Discoveries and Collections was issued as part of the BIOTA 2030 initiatives, in accordance with the program's strategic plan for the next eight years. Proposals were required to focus on creating and maintaining biodiversity and ecosystem services, which correspond to two of the five legs of the program. The others are synthesis, transformation, and entrepreneurship. BIOTA 2030 was drawn up with the participation of the academic community via public consultation and meetings organized by the program to discuss the results of funded research projects, endeavoring to correlate these discussions with the Sustainable Development Goals (SDGs) adopted by the United Nations. The program also issued the second call for proposals under an agreement with the São Paulo State Department of Infrastructure and Environment (SIMA) and the São Paulo State Forest Conservation and Production Foundation (Fundação Florestal, FF). The agreement supports management of conservation units, especially the Jureia-Itatins Ecological Station, by means of biodiversity conservation, restoration and sustainable use, with the aim of achieving the Aichi Biodiversity Targets (CDB Strategic Plan for Biodiversity 2011-2020, Convention on Biological Diversity)

TABLE 30

BIOTA

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grant associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grant BIOTA	996,216	10	69
Research Grant BIOTA – PIPE	1	0	0
Research Grant BIOTA – JP	286,070	1	10
Research Grant BIOTA – Thematic	2,374,629	2	27
Research Grant BIOTA – CCD	63,009	0	1
Research Grant BIOTA – Organization	0	2	2
Research Grant YIG – Phase 2	37,217	1	1
Regular Grants	27,397	2	6
Regular Scholarships/Fellowships	2,577,471	59	159
Research Internships and Fellowships Abroad (RIA, RFA)	540,054	21	18
Fellowships BIOTA – PE	174,857	1	5
Fellowships – Technical Training	208,525	33	63
Total	**7,285,446**	**132**	**361**

BIOEN

Goals: stimulating and organizing research and development by academic and industrial laboratories to advance and apply knowledge in areas relating to bioenergy production in Brazil.

In 2022, the program announced four proposals selected under the joint call with SIMA to support research on the production of bioenergy from solid and liquid urban and agroindustrial waste. In another call, this time in partnership with the IEA Bioenergy Technology Collaboration Program, an initiative of the International Energy Agency, BIOEN will select bioenergy research projects that propose to develop efficient solutions for long-distance transportation. FAPESP's contribution to funding for these projects will total $ PPP 7.8 million.

TABLE 31

BIOEN

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grant associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grant BIOEN	687,261	11	33
Research Grant BIOEN – Thematic	1,028,462	0	9
Research Grant BIOEN – PIPE	9,840	1	2
Research Grant BIOEN – PITE	9,467	0	1
Research Grant BIOEN – YIG Phase 1	240,947	0	5
Research Grant BIOEN – YIG Phase 2	288,683	1	1
Research Grants – Regular	41,550	1	5
Young Investigator – Phase 2	204,860	2	4
Research Grant – PIPE	40,083	1	1
Regular Scholarships/Fellowships	1,314,090	26	74
Fellowship BIOEN – YIG	43,836	0	1
Fellowship BIOEN – PE	10,679	1	1
Fellowship PE	7,469	1	1
Fellowships – Technical Training	130,682	16	31
Total	**4,057,907**	**61**	**169**

MEDIA COVERAGE OF RESEARCH RESULTS: **BIOTA**

Novel compounds discovered in marine sponge can kill drug-resistant bacteria

CHEMISTRY

FAPESP Process 2013/50228-8

INSTITUTION: IQSC-USP
PI: Roberto G. de Souza Berlinck

33 media outlets
agencia.fapesp.br/39092

A research group led by scientists at the University of São Paulo's São Carlos Institute of Chemistry (IQSC-USP) identified a number of bioactive compounds in a marine sponge collected on Fernando de Noronha, an archipelago about 400 km off the coast of Pernambuco. Some of the substances proved capable of killing bacteria that are resistant to currently available antibiotics, paving the way to development of new drugs. An article on the study was published in the *Journal of Natural Products*.


Compostos de esponjas-do-mar podem agir contra bactérias resistentes a antibióticos


Byte

Compostos de esponjas-do-mar podem agir contra bactérias resistentes a antibióticos


PODER

Compostos de esponjas-do-mar matam bactérias, diz estudo

Extant species of Atta leaf-cutting ants may have benefited from expansion of the Cerrado more than a million years ago

MICROBIOLOGY AND GENETICS

FAPESP Processes 2019/03746-0, 2019/24470-2

INSTITUTIONS: IB-UNESP Rio Claro and University of Utah (Estados Unidos)
AGREEMENTS: NSF – Dimensions of Biodiversity and BIOTA
PI: André Rodrigues, Mauricio Bacci Junior and Bryn Dentinger

25 media outlets
agencia.fapesp.br/38315

Published in *Systematic Entomology*, a study conducted by researchers at the State University of Campinas's Institute of Biosciences (IB-UNICAMP) in Brazil, in collaboration with colleagues in Argentina and the United States, suggested that an explosion of new species of Atta leaf-cutting ants appears to have occurred between 1 million and 3 million years ago, when the Cerrado was expanding. However, the recent expansion of agriculture in the region appears to be having a negative effect on species diversity among Atta there and to be favoring species considered agricultural pests.


FOLHA DE S.PAULO

Saúvas podem ter se beneficiado da expansão do cerrado, indica estudo


Sauvas puede haberse beneficiado de la expansión del Cerrado, indica estudio - 03/03/2022 - Ciencia / Brasil

MEDIA COVERAGE OF RESEARCH RESULTS: **BIOTA**

Northeast region probably dried up during Earth's last minimum axial tilt thousands of years ago

OCEANOGRAPHY AND INTERDISCIPLINARY

FAPESP Processes 2018/15123-4, 2019/24349-9

INSTITUTIONS: EACH-USP and University of Turku (Finlândia)
PI: Cristiano Mazur Chiessi and Hanna Tuomisto

33 media outlets

agencia.fapesp.br/38534

An article published in *Quaternary Science Reviews* showed that tree density in the Cerrado has been controlled mainly by the length of the dry season in the past 45,000 years. The article resulted from two projects conducted at the University of São Paulo's School of Arts, Sciences and Humanities (EACH-USP). An understanding of how ecosystems adapted to past changes can provide a long-term perspective on the magnitude of the ongoing ecological changes, and of their spatial and temporal aspects.

MEDIA COVERAGE OF RESEARCH RESULTS: **BIOEN**

Researchers discover bacteria capable of killing fungus that causes yield-reducing disease in sugarcane

MICROBIOLOGY

FAPESP Process 2017/24395-5

INSTITUTION: CNPEM
PI: Juliana Velasco de Castro Oliveira

307 media outlets

agencia.fapesp.br/38313

A study conducted at the Brazilian Center for Research in Energy and Materials (CNPEM) has discovered that three strains of *Pseudomonas bacteria* can inhibit growth, and even cause the death, of the fungus responsible for pineapple sett rot, a disease that attacks sugarcane, especially in the planting season. The results, reported in *Environmental Microbiology*, a journal of the UK's Society for Applied Microbiology, could serve as a basis for the development of biological fungicides as an alternative to the chemical pesticides currently used to combat the disease.

INSTITUTIONAL DEVELOPMENT PLAN FOR STATE RESEARCH INSTITUTIONS (PDIp)

Goals: support for modernization initiatives at 12 research institutions in São Paulo State with research proposals selected in a 2018 call, disbursing funds for capital and running costs (fixed assets, consumables and contractors, among others), and for scholarships and research grants.

The program supports the following state-run research institutions: Adolfo Lutz Institute, Agronomy Institute, Biology Institute, Butantan Institute, Dante Pazzanese Institute, Botany Institute, Energy and Nuclear Research Institute (IPEN), Technological Research Institute (IPT), Food Technology Institute (ITAL), Animal Science Institute, Geology Institute, Office of Endemic Disease Control (SUCEN).

TABLE 32 PDIp

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grant associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grant PDIp	4,870,528	0	12
Research Grant YIG	262,925	2	7
Research Grant PPP	112,575	1	5
Research Grant PITE	0	1	1
Research Grant – Regular	24,536	0	2
Research Grant – Publications	0	0	1
Regular Scholarships/Fellowships	1,185,271	29	77
Research Internships and Fellowships Abroad (RIA, RFA)	436,115	11	10
Fellowship YIG	237,851	2	7
Fellowships – Technical Training	146,178	11	23
Total	**7,275,978**	**57**	**145**

SCIENCE FOR DEVELOPMENT CENTERS (SDCs)

Goals: funding for scientists at universities and research institutions in São Paulo State, managers of state and municipal agencies, companies and non-governmental organizations to collaborate on problem-oriented projects with social or economic relevance to the state for a five-year period.

SDCs are co-funded by FAPESP, municipal and state government departments and additional partners in private enterprise or the third sector. FAPESP's contribution must be matched by identical funding from partner entities.

Two calls were issued (in 2019 and 2021), and 28 SDCs were selected. In 2022, 17 new SDCs were selected in the second call (May 2021).

TABLE 33 SDCs

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grant associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grant SDC	1,489,839	16	19
Research Grant – Visiting Researcher Abroad	1,436	1	0
Regular Scholarships/Fellowships	165,232	16	18
Research Internships and Fellowships Abroad (RIA, RFA)	0	2	0
Fellowships – Technical Training	76,554	18	18
Total	**1,733,060**	**53**	**55**

PROPOSALS SELECTED IN 2022 – SDCs

1 **Center for Water and Food Security in Critical Zones**
FAPESP Process: 2021/11762-5
Humberto Ribeiro da Rocha
Institute of Astronomy, Geophysics and Atmospheric Sciences, University of São Paulo

2 **Xenotransplantation Science for Development Center**
FAPESP Process: 2021/11872-5
Silvano Mario Attilio Raia
Medical School, University of São Paulo

3 **São Paulo Center for Research on the Energy Transition (CPTEn)**
FAPESP Process: 2021/11380-5
Luiz Carlos Pereira da Silva
School of Electrical Engineering and Computation, State University of Campinas

4 **Cancer Control in São Paulo State (ConeCta-SP): from knowledge to action**
FAPESP Process: 2021/11794-4
Victor Wunsch Filho
São Paulo Cancer Center Foundation

5 **Science, Technology and Development Center for Innovation in Medicine and Health: inLab.iNova**
FAPESP Process: 2021/11905-0
Giovanni Guido Cerri
Medical School, University of São Paulo

6 **Beef Cattle Climate Neutrality in Tropical Regions Science for Development Center**
FAPESP Process: 2021/11922-2
Renata Helena Branco Arnandes
Institute of Animal Science

7 **Center for Translational Science and Development of Biopharmaceuticals**
FAPESP Process: 2021/11936-3
Benedito Barraviera
Center for Research on Venom and Venomous Animals, São Paulo State University

8 **Center for Viral Surveillance and Serological Assessment (CeVIVAS)**
FAPESP Process: 2021/11944-6
Sandra Coccuzzo Sampaio Vessoni
Butantan Institute

9 **Solutions for Combating Emerging Diseases in Fish Farming: Diagnosis, Vaccines and Genetic Selection**
FAPESP Process: 2021/11955-8
Maria Jose Tavares Ranzani de Paiva
Fisheries Institute

Innovation- and Knowledge-based Urban Development Research Center (CEUCI)

10 **Knowledge of urban periphery; guidelines for sustainable implementation with support from information modeling**
FAPESP Process: 2021/11962-4
Maria Gabriela Caffarena Celani
School of Civil Engineering, Architecture and Urbanism, State University of Campinas

11 **Center for Research on Thromboembolic Diseases (CCT)**
FAPESP Process: 2021/11963-0
Joyce Maria Annichino Bizzacchi
Hematology and Hemotherapy Center, University of Campinas

12 **Science for Development Center: Solutions for Post-Consumption Waste, Packaging and Products**
FAPESP Process: 2021/11967-6
Eloisa Elena Correa Garcia
Institute of Food Technology

13 **Center and Technological Platform for Animal Health**
FAPESP Process: 2021/11968-2
Liria Hiromi Okuda
Biology Institute

14 **Cities: Center for Innovation in Urban Public Policies**
FAPESP Process: 2021/11959-3
Ciro Biderman
São Paulo Business School, Getúlio Vargas Foundation

15 **Technological Innovation Platform for Health Emergencies**
FAPESP Process: 2021/11946-9
Durvanei Augusto Maria
Butantan Institute

16 **Digital Agriculture Science for Development Center (CCD-AD/SemeAr)**
FAPESP Process: 2022/09319-9
Silvia Maria Fonseca Silveira Massruhá
EMBRAPA Digital Agriculture

17 **Restoration of native vegetation in Atlantic Rainforest areas by a strategic combination of obligatory measures and voluntary commitments (CCD-EMA)**
FAPESP Process: 2021/11940-0
Paulo Guilherme Molin
Center for Natural Sciences, Federal University of São Carlos

MEDIA COVERAGE OF RESEARCH RESULTS: CCD

Academia, civil society and government join forces in new center for nature-based solutions

ECOLOGY

FAPESP Process 2020/06694-8

INSTITUTION: IEA-USP
PI: Jean Paul Walter Metzger

24 media outlets
agencia.fapesp.br/38760

Scientists, public administrators and civil society organizations in São Paulo State will join forces for the next five years in BIOTA Synthesis, the Center for Analysis and Synthesis of Nature-Based Solutions, hosted by the University of São Paulo's Institute for Advanced Studies (IEA-USP). Officially launched in May 2022, it will develop solutions to challenges relating to sustainable agriculture, water security, and control of zoonotic diseases.

Risk of urban tree falls in São Paulo is influenced by building height and age of neighborhood

BOTANY

FAPESP Process 2017/50341-0

INSTITUTION: IPA
PI: Luiz Mauro Barbosa

11 media outlets
agencia.fapesp.br/39670

According to a study by the Environmental Research Institute (IPA) reported in the journal *Urban Forestry & Urban Greening*, the factors that most influence and increase the risk of tree failure in São Paulo City are the height of nearby buildings and the age of the neighborhood. Sidewalk width and tree height are the next most significant variables.

RESEARCH PROGRAM ON GLOBAL CLIMATE CHANGE (RPGCC)

Goals: support for research projects that contribute to decision making on the societal and economic impacts of global warming for Brazil. The researchers involved belong to international networks and are at the forefront of important discoveries and recommendations on mitigation measures in the Amazon, coastal areas and major cities, among others.

In 2022, RPGCC issued two calls for proposals. One reserved $ PPP 3.9 million to fund projects focusing on land-use changes and agriculture, especially solutions to reduce deforestation, forest degradation, and the associated CO_2 emissions in all biomes. The selected projects will also involve strategies to raise crop yields and productivity throughout the food production chain, contributing to food and nutritional security in the context of global climate change.

The other call focused on accelerating the energy transition in São Paulo State and Brazil, with BRL 10 million available for projects offering analysis and future visions on this topic, especially in connection with technological innovation in energy production and use (electricity and fuels), physical infrastructure, institutional and regulatory frameworks, and biodiversity conservation, among others.

TABLE 34 RPGCC

Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grant associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grants RPGCC	282,734	2	11
Research Grants RPGCC – YIG	251,969	0	2
Research Grants RPGCC – YIG 2	93,293	1	2
Research Grants RPGCC – Thematic	4,164,443	1	16
Research Grants – YIG Phase 2	56,157	1	1
Research Grants – Regular	54,895	2	7
Research Grants – Visiting Researcher	73,278	0	1
Research Grants – Publications	2,578	1	2
Fellowship RPGCC – YIG	51,927	0	2
Regular Scholarships/Fellowships	2,051,300	38	129
Research Internships and Fellowships Abroad (RIA, RFA)	803,486	24	29
Fellowships – Technical Training	198,710	13	29
Fellowships – Science Journalism	1,959	0	2
Total	**8,086,728**	**83**	**233**

SCIENCE JOURNALISM (MÍDIACIÊNCIA)

Goals: supporting the education and training of science disseminators by awarding undergraduate and graduate fellowships under the aegis of the José Reis Program. FAPESP allocated $ PPP 118,497 to this program, which had 11 active projects and awarded seven new fellowships in 2022.

MEDIA COVERAGE OF RESEARCH RESULTS: GLOBAL CLIMATE CHANGE

Fire in the Amazon is associated more with agricultural burning and deforestation than with drought

GEOSCIENCES AND INTERDISCIPLINARY

FAPESP Processes 2016/02018-2, 2020/15230-5

INSTITUTIONS: INPE and Cemaden
AGREEMENT: Confap
PI: Luciana Vanni Gatti and Liana Oighenstein Anderson

38 media outlets
agencia.fapesp.br/39961

A study by researchers at the National Space Research Institute (INPE), the National Disaster Surveillance and Early Warning Center (CEMADEN) and the Federal University of Maranhão (UFMA) showed that the number of fires detected in the entire Amazon region between 2003 and 2020 was influenced more by uncontrolled human use of fire than by drought. According to the researchers, burning of vegetation to prepare areas for pasture and deforestation rather than extreme water deficits were the main cause of fire in most years with large numbers of fires. An article reporting the study was published in a special issue of *Global Ecology and Biogeography* on the increasing threat posed to the world's forests by fire.

Even the smallest pollution particles change the rainfall regime in the Amazon

GEOSCIENCES

FAPESP Process 2017/17047-0

INSTITUTION: IF-USP
PI: Paulo Artaxo

43 media outlets
agencia.fapesp.br/37838

A study conducted in Manaus found that nanoparticles resulting from human activities such as the burning of fossil fuels rapidly grow in the atmosphere and influence cloud formation. The discovery by researchers at the University of São Paulo's Physics Institute (IF-USP) will help make meteorological models and climate change simulations more accurate.

MEDIA COVERAGE OF RESEARCH RESULTS: **GLOBAL CLIMATE CHANGE**

Deforestation of Indigenous lands could prevent Brazil from achieving climate change mitigation targets

GEOSCIENCES

FAPESP Processes 2016/02018-2, 2019/25701-8

INSTITUTION: National Space Research Institute (INPE)
PI: Luciana Vanni Gatti and Luiz Eduardo Oliveira e Cruz de Aragão
GRANTEE Guilherme Augusto Verola Mataveli

32 media outlets
agencia.fapesp.br/38410

According to a letter by Brazilian researchers published in the journal Science, Indigenous lands in the Brazilian Amazon are under constant pressure, and deforestation of these areas has accelerated in recent years. Some of them, such as Apyterewa Indigenous Territory in Pará state, are particularly affected, endangering Brazil's ability to meet the targets to which it is committed internationally in terms of combating deforestation and mitigating the impact of climate change. Effective action to enforce the environmental legislation is required to protect the last intact frontiers of the Amazon, the authors stressed.

Researchers plan to reconstitute formation of Amazonia by analyzing sediments and rocks

GEOSCIENCES

FAPESP Process 2018/23899-2

INSTITUTION: IGc-USP
PI: André Oliveira Sawakuchi

11 media outlets
agencia.fapesp.br/39898

How and when did Amazonia emerge? A project conducted at the University of São Paulo's Institute of Geosciences (IGC-USP) set out to answer this question. It involved institutions in 11 countries and 60 researchers, 30 of whom were based in Brazil. Boreholes will be drilled to depths ranging from 800 meters to 2 kilometers at strategic sites in the states of Acre, Amazonas and Pará. The plan was to reconstitute Amazonia's origins and history using sediments and rocks.

eSCIENCE & DATA SCIENCE

Goals: supporting integration between research groups involved in investigating algorithms, computational modeling and data infrastructure, and groups of scientists involved in other knowledge areas.
In 2022, a new call for proposals reserved $ PPP 8.1 million for investment in collaborative projects led by researchers in computation and human and social sciences.

TABLE 35
eSCIENCE & DATA SCIENCE
Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grant associated	Disbursement $ PPP	New projects contracted	Active projects
Research Grant eScience	108,139	1	7
Research Grant eScience – PIPE	36,691	0	2
Research Grant eScience – Temathic	87,497	0	1
Fellowship eScience – PE	25,165	0	1
Regular Scholarships/Fellowships	219,887	5	13
Research Internships and Fellowships Abroad	35,243	1	1
Fellowships – Technical Training	46,249	2	5
Total	**558,870**	**9**	**30**

RESEARCH PROGRAMS ON PUBLIC POLICIES

Goals: supporting research on solutions to social needs that result in implementation of public policies:

- **FAPESP Research Program on Public Policies (PPP)**
- **Research on Public Policies for the Unified Health Service (PP-SUS)** – the Ministry of Health and National Council for Scientific and Technological Development (CNPq) transfers resources to FAPESP under an agreement to fund the PP-SUS program.
- **Public Education** – funding for research projects to develop new initiatives that contribute to improvements in primary and secondary public education.

TABLE 36
PPP, PP-SUS AND PUBLIC EDUCATION
Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grant associated	Disbursement $ PPP	New projects contracted	Active projects
PPP	**4,150,924**	**38**	**84**
PPP Grants	3,885,484	1	29
Research Grants – Publication	3,919	1	1
Regular Fellowships in Brazil	140,118	1	6
Fellowships – Technical Training	121,403	35	48
PP-SUS	**0**	**0**	**0**
Public Education	**200,791**	**56**	**98**
EP Grants	40,326	3	11
EP Fellowships	147,733	48	74
Fellowships – Technical Training	12,732	5	13

In 2022, FAPESP and the São Paulo State Department of Education (SEDUC) issued the first call for proposals under the PROEDUCA program, which supports research on basic education. Proposals were to entail contributions to public policies and teaching methods that improve educational attainment and reduce inequality in the school system. FAPESP will allocate $ PPP 7.8 million to fund projects selected in this call, and SEDUC will invest $ PPP 3.8 million, giving a total of $ PPP 11.6 million. Projects submitted in this call must focus on one or more of the following six strategic areas: teaching and learning processes in basic public education; teacher training and development; management of learning and assessment; school management; equity, diversity and inequality reduction in education; and technology, innovation and vocational training in basic education. Three PROEDUCA calls will be issued between 2022 and 2024. Proposals are to be submitted for funding under FAPESP's Public Education Program and Public Policy Research Program, and for Thematic Projects and Regular Research Grants.

MEDIA COVERAGE OF RESEARCH RESULTS: **e-SCIENCE**

Study can help breeders select beef cattle that gain weight more easily and emit less methane

ANIMAL SCIENCE

FAPESP Process 2019/04089-2

INSTITUTION: EMBRAPA Pecuária Sudeste
PI: Luciana Correia de Almeida Regitano

9 media outlets
agencia.fapesp.br/40007

Scientists at EMBRAPA Livestock Southeast and collaborators analyzed the microorganisms present in the feces of Nelore bulls and found biomarkers that can identify animals that emit less methane and can more easily make use of the nutrients in their diet to gain weight. The study was conducted under the auspices of the eScience and Data Science program. The research team comprised veterinarians, biologists, bioinformaticians, epidemiologists and computer scientists.

MEDIA COVERAGE OF RESEARCH RESULTS: **PPPP**

Telemedicine arrived during the pandemic and came to stay, study shows

COLLECTIVE HEALTH

FAPESP Process 2017/50356-7

INSTITUTIONS: FM-USP, UFMA and Queen Mary University of London
PI: Mário César Scheffer and Giuliano Russo

522 media outlets
agencia.fapesp.br/40295

A survey of 1,183 physicians in the states of São Paulo and Maranhão showed that the various uses of telemedicine, which turned out to be a significant alternative during the public health crisis caused by COVID-19, are set to be a permanent feature of the nation's health system. The study was conducted by researchers at the University of São Paulo's Medical School (FM-USP), the Federal University of Maranhão (UFMA) and Queen Mary University of London in the UK.

An article about it was published in *Globalization and Health*.

SUPPORT FOR RESEARCH INFRASTRUCTURE

FAPESP maintains seven programs that assure provision of the infrastructure needed for the advancement of research in São Paulo State.

In 2022

$ PPP 50.3 million

924 active projects.

278 new projects.

RELATED PROGRAM

Multi-User Equipment – www.fapesp.br/emu
Acquisition of equipment for shared use by the scientific community.

Equipment Repair – www.fapesp.br/339
Repair and preventive maintenance of equipment.

Support for Infrastructure – www.fapesp.br/paip
Maintenance of museums, information repositories, documents and biological collections.

Three types of Technical Reserve – www.fapesp.br/rt
Additional funding for institutions to cover unforeseen expenses in research projects.

Acess to Rednesp (Research and Education Network at São Paulo) – www.fapesp.br/49
formerly ANSP Network, connecting dozens of higher education and research institutions in São Paulo State and abroad via cooperation with consortia and academic networks such as AmLight, RedCLARA and GNA-G.

TABLE 37
SUPPORT FOR RESEARCH INFRASTRUCTURE
Disbursement, number of active projects and new projects contracted in 2022

Fellowships and Grants associated	Disbursement $ PPP	New project contracted	Active projects
Multi-user Equipment	22,236,056	80	442
Equipament Repair	1,272,107	74	168
REDNESP	9,892,513	0	1
Overhead – Institutional Research Infrastructure	14,625,265	108	283
Overhead – Program Coordination	377,829	12	20
Overhead – REDNESP	1,892,839	4	10
Total	**50,296,608**	**278**	**924**

In 2022, FAPESP issued three calls for multiuser equipment proposals (MUE). Allocations were as follows: scientific use $ PPP 100.7 million; technological use and innovation $ PPP 54.3 million; information repositories, archives or historiographical and biological collections $ PPP 19.4 million.

MEDIA COVERAGE OF RESEARCH RESULTS: **INFRASTRUCTURE**

A high-speed fiber optic network will connect universities in São Paulo State

Research and Education Network at São Paulo (REDNESP)

PI: João Eduardo Ferreira

268 media outlets

agencia.fapesp.br/39728

A high-speed fiber optic network was launched in September 2022 to connect universities in São Paulo State to each other and institutions abroad for sharing of scientific data, classroom materials and high-performance data processing. It will also serve as a multiuser environment for research in engineering and computation. Known as Backbone SP, it will link the University of São Paulo (USP), Mackenzie Presbyterian University (UPM), São Paulo State University (UNESP), the State University of Campinas (UNICAMP), the Federal University of São Paulo (UNIFESP), the Federal University of São Carlos (UFSCar), the Federal University of the ABC (UFABC), and the Aeronautical Technology Institute (ITA). It will be operated by the Research and Education Network of São Paulo (REDESP, formerly Rede ANSP), which is supported by FAPESP. The link among the eight universities in São Paulo will offer a data rate of 100 Gigabits per second (Gbps), but will be scalable, permitting faster rates as needed.


FOLHA DE S.PAULO

Rede digital vai turbinar trocas de informação entre universidades paulistas


EDUCAÇÃO

Fibra óptica de alta velocidade vai conectar universidades paulistas


Digital network will boost information exchange between São Paulo universities

FUNDING STRATEGIES

DIFFUSION OF SCIENTIFIC KNOWLEDGE, MAPPING OF RESEARCH UNITS AND STUDIES OF THE GENERAL CONDITION OF RESEARCH IN SÃO PAULO STATE

This funding strategy encompasses initiatives to publicize the societal, economic and environmental impacts of the research projects supported by FAPESP, its scientific policy guidelines, calls for proposals and other information, and actions to map and evaluate the overall status of research in the state, as required by the law that established FAPESP.

In 2022

$ PPP 8.5 million

allocated to research diffusion, mapping and evaluation projects.

COMMUNICATING SCIENTIFIC KNOWLEDGE TO THE PUBLIC

PESQUISA FAPESP MAGAZINE

revistapesquisa.fapesp.br/en

PAPER EDITION (monthly)

In 2022, the magazine's monthly print run averaged 29,700, a similar number to the previous year's (30,000). Newsvendor sales rose 31.2% compared with 2021, while the number of paying subscribers fell 9.1%. Distribution to state-run high schools was unchanged:

- 6,002 paying subscribers in December 2021.
- Newsvendor sales averaging 876.
- 3,674 copies per month distributed to high schools in São Paulo State. .

The international print edition of the magazine began circulating again in 2022 after a pause of almost three years due to the COVID-19 pandemic.

In August 2022, the print edition of *Pesquisa FAPESP* contained 14 articles on the 200th anniversary of Brazil's independence, occupying 67 pages. They presented newly discovered documents, reappraised data and novel approaches to the historic event. Coverage of the anniversary on the website began at the start of the year, amounting to more than 30 articles, videos and podcasts produced by the editorial staff of the magazine and still available in full. This was the best-selling issue in 2022 (1,160 copies sold).

SITE

Site traffic held almost steady in 2022, falling slightly compared with the previous year. Hits fell 4.1%, pages visited were down 4.3%, and users slipped 1.8%.

5.66 million visits (sessions) – monthly average: **472,300**.

4.54 million users – monthly average **278,000**.

7.07 million page views – monthly average **589,200**.

SITE TRAFFIC

The digital content produced by Pesquisa FAPESP is accessed by organic search (via search engines such as Google) or direct search (via the URL). In 2022, direct search rose 11.2%, to account for 15.1% of the total (857,000 sessions), but organic search, while falling 9.4%, still accounted for 69% (3.91 million sessions). Traffic via social media rose 13.9% to 11.5% of the total (649,700 sessions). Access via the newsletter rose 246.5% to 0.77% of the total (43,700 sessions); the unusually large growth rate reflected the still incipient 2021 baseline.

SITE TRAFFIC VIA SOCIAL MEDIA

Twitter replaced Facebook as the platform that sent most readers to the magazine's website, gaining 112% compared to 2021. Facebook fell (50.5%), as did YouTube (37.3%), while Instagram rose 45.11%.

- Facebook: 25.1%
- Twitter: 69.5%
- Instagram: 2.1%
- YouTube: 0.7%
- Outros: 2.6%

PESQUISA FAPESP ON SOCIAL MEDIA

The magazine's aggregate social media audience remained stable in 2022, with slight increases in numbers of followers on Facebook (2%) and Twitter (3%), and somewhat more substantial growth in Instagram (11%) and YouTube (9%). Engagement rose on Instagram (85.5%) and Twitter (25%), but fell on Facebook (49%) and YouTube (63%).

Plataform	Followers	Engagement (interations)
Facebook	187,600	287,500
Twitter	97,200	41,200
Instagram	62,400	261,900
YouTube	87,000	881,900

RADIO PROGRAM AND PODCAST

A new "Pesquisa Brasil" radio program was produced every week of the year by a partnership between *Pesquisa FAPESP* and Rádio USP. Of the 53 programs, five were thematic, mostly discussing the magazine's cover stories. The rest featured interviews on three different subjects each. All programs are available as podcasts from the main aggregators, such as Spotify and Deezer.

OTHER NUMBERS

- **125** content items (news stories, infographics, photos and videos) licensed to publishers of teaching material in 2022.
- **2,262** reproductions or citations of the magazine's content in magazines, newspapers, news sites, scientific journals and other media outlets, as well as citations in scientific articles and theses.

FAPESP NEWS AGENCY (AGÊNCIA FAPESP DE NOTÍCIAS) agencia.fapesp.br/en

- **147,103 subscribers*** (-0.5%)
  - Portuguese (daily circulation): **137,496** (-0.6%)
  - English (weekly): **7,977** (-1.3%)
  - Spanish (weekly): **1.630** (+3.0%)

* In February 2022, the electronic registration system deleted 7,795 subscriber email addresses for being non-compliant or including invalid dominions.

VISITS

- **3.1 million** visits to *Agência FAPESP*'s websites in all three languages (-30.6%) – Chart 8.

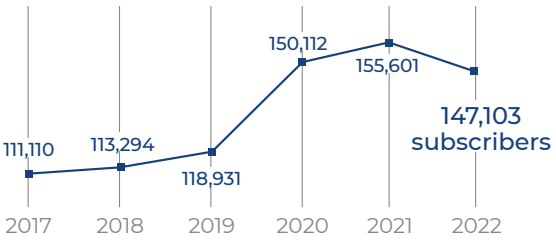
AGÊNCIA FAPESP IN THE MEDIA

In 2022, media outlets published **33,848** news items (-8%) with content from *Agência FAPESP*.

Most Admired by Journalists

For the second consecutive year, *Agência FAPESP* was elected best news agency in a contest for prizes known as Prêmio Einstein +Admirados da Imprensa de Saúde, Ciência e Bem-estar ("Most Admired in the Media on Health, Science and Wellbeing"). Karina Toledo, Agência FAPESP's editor, was rated one of the most admired Brazilian journalists, alongside 25 others. Awarded by Jornalistas&Cia in partnership with the Albert Einstein Jewish-Brazilian Charitable Society (SBIBAE), the prizes recognize the importance of science journalism to society and journalism itself..

CHART 7 ANNUAL CHANGE TO TOTAL NUMBER OF SUBSCRIBERS



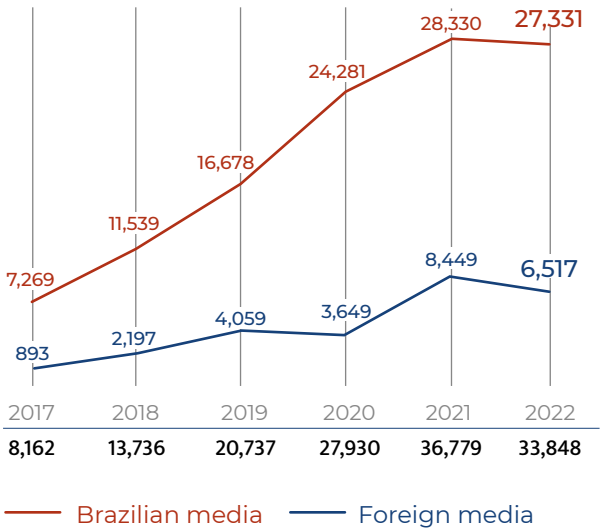
Sourece: *Agência FAPESP*, management system, June, 14th 2023.

TABLE 38 ANNUAL CHANGE TO TOTAL NUMBER OF VISITS TO SITES

	Portuguese	English	Spanish
2017	2,281,863	44,132	29,970
2018	2,864,555	58,079	45,573
2019	3,736,768	80,564	58,199
2020	4,995,997	90,111	87,858
2021	4,045,155	115,781	307,065
2022	2,807,764	86,215	198,601

Source: Google Analytics, June, 14th 2023.

CHART 8 NUMBER OF NEWS STORIES PUBLISHED BY MEDIA OUTLETS WITH AGENCIA FAPESP CONTENT



The above annual figures are sum totals of media citations, reproductions and edited versions of texts published on Agência FAPESP's websites and content from the daily newsletter sent by Media Relations to the Brazilian press and to the EurekAlert and DiCYT platforms.

Source: Sistema FAPESP Na Mídia, June 14th 2023.

SOCIAL MEDIA

Facebook – @agfapesp

- 51,536 followers: 2,290 new in 2022 (+4.65%).
- 1,228 posts.

MOST POPULAR POSTS IN 2022: "Study raises hypothesis that cabreúva tree [Myrocarpus frondosus] serves as 'pharmacy' for several animal species" (38,800 engagements and 413,800 people reached) and "UNESP student awarded prize by Brazilian Association of Engineering and Mechanical Sciences" (18,800 engagements and more than 241,000 people reached).

Twitter – @AgenciaFAPESP

- 83,789 followers: 2,035 new in 2022 (+2.5%).
- 2,028 posts.

MOST POPULAR POSTS IN 2022: "FAPESP raises value of scholarships in Brazil by 15%" (447 engagements and 10,500 impressions) and "Study shows high prevalence of depression, anxiety and post-traumatic stress after COVID-19" (441 engagements and 33,800 impressions).

Instagram – @agenciafapesp

- 29,873 followers: 4.325 new in 2022 (+16.9%).
- 245 posts in feed and 652 in stories.

MOST POPULAR POSTS IN 2022: "Face mask wearing does not affect breathing or cardiovascular response during exercise" (2,700 interactions).

LinkedIn – @fapesp

- FAPESP Innovation profile created in November 2021.
- 53,339 followers: 23,118 news in 2022.
- 26 posts.

MOST POPULAR POSTS IN 2022: "Group obtains biodegradable plastic that is edible, antimicrobial and more resistant than the conventional kind" (2,158 interactions and 48,578 impressions).

YouTube – /fapespagencia

- 50,086 subscribers, more than 6,100 news in the year (+16%).
- 199 vídeos posted.
- 556,100 views and 4.6 million impressions.

MOST POPULAR VIDEOS IN 2022: "Concert to commemorate FAPESP's 60th anniversary" (produced in 2022, 6,900 views) and "Open science – Indigenous peoples of Brazil" (produced previously, 55,500 views).

FAPESP INNOVATIVE R&D (PESQUISA PARA INOVAÇÃO) (WEEKLY) pesquisaparainovacao.fapesp.br

- 48 newsletters produced in 2022.
- 59,091 visits to the site (-15%).
- 686 news stories published by media outlets in Brazil and abroad with content from newsletter (text captured directly or distributed by FAPESP Media Relations).
- 11,979 email subscribers (-10.7%).

The newsletter is also distributed to members of CIESP/FIESP, SIMPI, Embrapii, ANPROTEC, CNPEN, EMBRAPA, DCTA, CIETEC, Supera Parque (RP), Chambers of Commerce (US, UK, Japan, Germany), technology parks in São Paulo and other states, innovation hubs (Itaú Cubo, Bradesco Inovabra etc.), trade associations (e.g. ABFIN, ABIMAQ) and innovation agencies.

VISUAL MEDIA

- **Modern Art Week: Research, Art and Literature** – Four webinars were held and recorded for this event on the centenary of *Semana de Arte Moderna*: Keynote lecture on modernism and film; Writings, files and resignifications; Images, migrations and memory; and Arts, creation and research (available on Agência FAPESP's YouTube channel).

- **FAPESP 60 Years:** the institutional video was updated, and interviews with researchers and representatives of partner companies were recorded. French pianist Eloïse Bella Kohn was interviewed at a concert honoring FAPESP at the University of São Paulo. A concert celebrating FAPESP's 60th anniversary at Sala São Paulo was broadcast live.

- **Genome 20+2:** a series of 15 interviews was recorded for a workshop held to celebrate the 20th anniversary of FAPESP's Genome Program (plus two years because of the pandemic). The highlights included interviews with Andrew Simpson, José Fernando Perez, Fernando Castro Reinach, Paulo Arruda and Marco Antonio Zago.
- **FAPESP Memory Center:** an initial series of interviews was recorded, featuring executives of FAPESP and eminent scientists in São Paulo, such as Marco Antonio Zago, José Goldemberg, Celso Lafer, Carlos Vogt, Carlos Henrique de Brito Cruz, Flávio Fava de Moraes, Rogério Cerqueira Leite, Hernan Chaimovich and Luiz Gonzaga Belluzzo. The interviews will be made available to the public when the FAPESP Memory Center is launched.

- **Postdoc Mentoring:** 13 videos were recorded for the Postdoc Mentoring Initiative for Research Career Consolidation. Production of the series continues
- **Ciência SP:** *Ciência SP* ("São Paulo Science"), launched on June 27, 2019, is a series of one-minute videos on the results and societal benefits of research projects supported by FAPESP. The videos can be viewed on Agência FAPESP's YouTube channel and social media (Instagram, Twitter and Facebook). In 2022, 46 episodes were produced and posted online, bringing the total to 190. A partnership between FAPESP and Rádio UNESP enabled broadcasts of weekly episodes.
- **Video reportages:** 11 videos were produced, featuring interviews with researchers and coverage of seminars and other scientific events.
- New recordings posted to Agência FAPESP's social media in the year totaled 199.

  YouTube: 199 videos posted. In 2022, the channel logged 556,100 views and 4.6 million impressions.

  Instagram: 47 videos posted in the series *Ciência SP*, with 54,000 views.

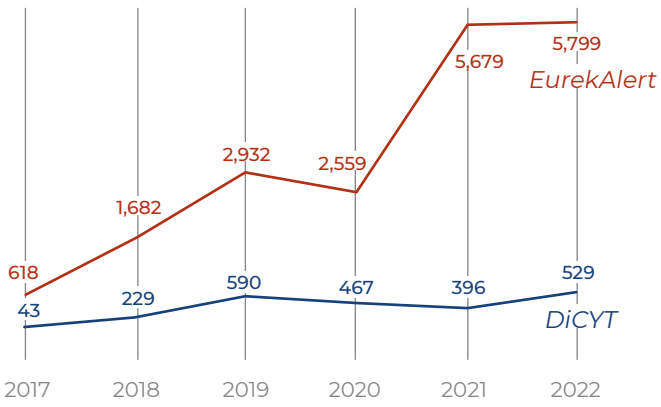
MEDIA RELATIONS

- 685 responses to media inquiries.
- 252 texts in English from Agência FAPESP posted on EurekAlert.
- Posts on *EurekAlert* resulted in 5,799* reproductions in foreign media outlets and 259,690 views by journalists.
- Publications by DiCYT on Agência FAPESP topics resulted in 529* reproductions in Spanish-language media outlets.
- Content produced by Agência FAPESP in Portuguese and sent daily to media outlets contributed to publication of 27,331* news items in Brazilian media outlets.

* See Chart 8 (*p. 126*).

CHART 9

ANNUAL CHANGE IN INTERNATIONAL COVERAGE VIA EUREKALERT AND DICYT



Source: Sistema FAPESP Na Mídia, June, 14th 2023.

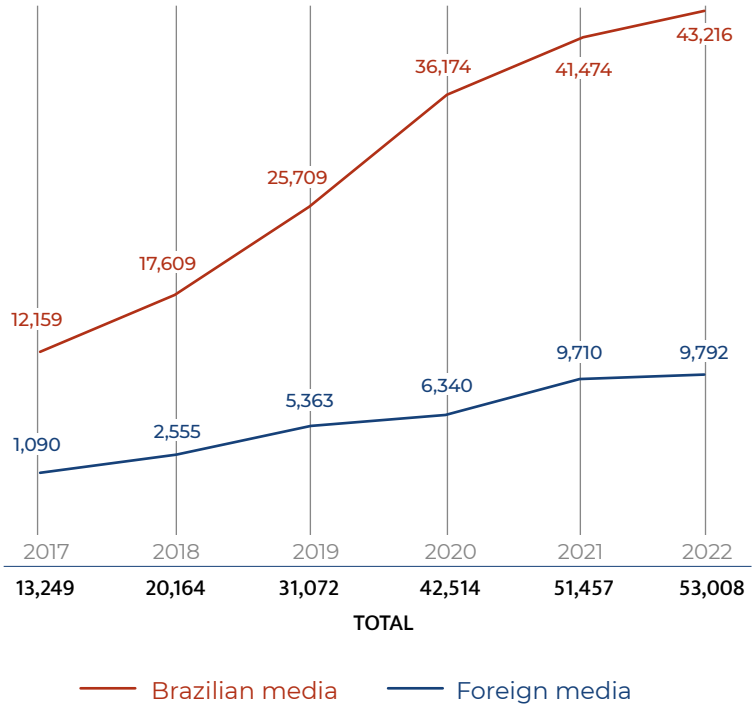
FAPESP'S VISIBILITY IN THE MEDIA

namidia.fapesp.br

In 2022, Brazilian and foreign media outlets published 53,008 news stories relating to research or researchers supported by FAPESP and about FAPESP itself, among other subjects, for an increase of 3% compared with 2021. These stories were sourced from Agência FAPESP, FAPESP Innovative R&D and Pesquisa FAPESP, or originated by the media outlets. About 83% mentioned FAPESP.

CHART 10

NEWS STORIES PUBLISHED BY MEDIA OUTLETS WITH AGENCIA FAPESP CONTENT



Source: Sistema FAPESP Na Mídia

- 53,008 news items about FAPESP:
  - 43,216 (+4%) carried by 6,318 media outlets in all Brazilian states.
  - 9,792 (+1%) carried by 3,864 media outlets in 107 countries.
  - 2,786 786 carried by 89 major Brazilian media outlets in terms of circulation or audience share, such as: Folha.com and FSP (416), UOL (241), Estadao.com and OESP (180), Yahoo! (176), Veja and Veja online (164), Valor Econômico and Valor online (140), Galileu (135), O Globo and O Globo online (117), Portal R7 (116), IstoÉ Dinheiro (82), g1 (80), CNN (70), Poder 360 (62), IstoÉ online (57), SBT Interior (54), Nexo Jornal (51), Agência Brasil (46), Correio Braziliense (35), TV Globo (22), TV Cultura (12), Agência Estado (8).

FAPESP NA MÍDIA WEBSITE

Brazilian and foreign media coverage of FAPESP's activities can be seen on the website "FAPESP na Mídia", which contains a searchable catalogue of over 319,700 news stories relating to FAPESP published since 1999. It logged 64,400 visits in 2022. This database serves as the raw material for FAPESP's media coverage statistics and analysis, as well as a daily electronic clipping service for internal use. The cataloguing procedure includes the FAPESP grant numbers corresponding to the research projects mentioned, so that links to the news stories can also be included on the Virtual Library (BV) pages presenting projects and researchers.

MOST WIDELY CITED OR REPRODUCED NEWS STORIES IN 2022*

TABLE 39

BRAZILIAN MEDIA

Top 10 news stories in terms of media coverage

	Title
1,262	Study shows high prevalence of depression, anxiety and post-traumatic stress disorder after COVID-19 (agencia.fapesp.br/37938)
1,150	Researchers locate novel targets for development of male contraceptive (agencia.fapesp.br/37934)
1,121	COVID-19 vaccine developed by Brazilian scientists is ready for clinical trials (agencia.fapesp.br/39737)
842	Scientific study points to direct link to alcohol and drug use in 31% of hospitalizations (agencia.fapesp.br/37791)
741	Risk of obesity is 45% higher among adolescents whose diet is based on ultra-processed food products (agencia.fapesp.br/38368)
684	Substance avoids progression of Parkinson's disease in pre-clinical trials (agencia.fapesp.br/38449)
563	COVID-19 vaccine prevented deaths of 63,000 older people in first eight months (agencia.fapesp.br/40109)
551	Study proposes to involve high school students in mapping natural disaster hazards and impact prevention (agencia.fapesp.br/38090)
551	Insect diversity is decreasing in Brazil, study shows (agenciabrasil.ebc.com.br/geral/noticia/2022-08/biodiversidade-de-insetos-no-brasil-esta-em-queda-mostra-estudo)
550	A comprehensive greenhouse gas emission database for the Amazon (agencia.fapesp.br/38178)

TABLE 40

FOREIGN MEDIA

Top 10 news stories in terms of media coverage

	Title
358	SARS-CoV-2 can remain active for longer than recommended quarantine period, study shows (www.eurekalert.org/news-releases/941471)
308	Amazon deforestation threatens newly discovered fish species in Brazil (www.eurekalert.org/news-releases/952137)
289	Study opens up new possibilities for treatment of Pitt-Hopkins syndrome (agencia.fapesp.br/39145)
222	Study shows that amino acid taurine could be used in anti-aging therapy (www.eurekalert.org/news-releases/959445)
203	El SARS-CoV-2 puede permanecer en el organismo por un tiempo superior al de la cuarentena recomendada (www.dicyt.com/noticias/el-sars-cov-2-puede-permanecer-en-el-organismo-por-un-tiempo-superior-al-de-la-cuarentena-recomendada)
192	Vitamin D deficiency increases risk of losing muscle strength by 78% (www.eurekalert.org/news-releases/974288)
181	Gravitational action of sun and moon influences behavior of animals and plants, study shows (www.eurekalert.org/news-releases/939240)
159	Risk of obesity is 45% higher among adolescents whose diet is based on ultra-processed food products (www.eurekalert.org/news-releases/949527)
151	Protein restriction can be effective in combating obesity and diabetes, study suggests (www.eurekalert.org/news-releases/965365)
150	Brazilian scientists reveal method of converting methane gas into liquid methanol (www.eurekalert.org/news-releases/960632)

*Source: Sistema FAPESP Na Mídia, June, 14th 2023

FAPESP PORTAL www.fapesp.br/en

The portal is the main interface between FAPESP and the general public, offering information on rules and regulations, funding lines, scholarship opportunities, agreements, and pages on many programs, events and institutional publications, among other items. It also provides access to other FAPESP sites, such as *Agência FAPESP*, *Pesquisa FAPESP*, FAPESP Innovative R&D, and FAPESP na Mídia.

The following sites were created in 2022: Amazônia+10 (www.amazoniamaisdez.org.br), Genome 20+2 (60anos.fapesp.br/genomeworkshop), and Webinários: A Ciência no Desenvolvimento (60anos.fapesp.br/aciesp-eventos) – a mini-site within the FAPESP 60 anos site (60anos.fapesp.br) hosting information about a series of seminars held by the São Paulo State Academy of Sciences (ACESP) to commemorate FAPESP's 60th anniversary. A new framework was also created for calls for proposals in Portuguese and English, with the following divisions: open calls (all), calls (general), international collaboration, national/regional collaboration, programs, innovative R&D, planned and past collaborative calls, and agreements (fapesp.br/chamadas).

- 14.9 million visits to home page and all sites hosted by portal in 2022 (-10,7%).

EVENTS www.fapesp.br/eventos

FAPESP held 70 science diffusion events, some of which were hybrid, i.e. both in-person and online. More than 12,000 people registered to take part in these events in person and during livestreaming or watched recordings of them on Agência FAPESP's YouTube channel (51,203 views).
The highlights were nine FAPESP 60 Years Conferences, a webinar series on Science in National Development, and the Genome 20+2 Workshop. Other events included those held to clarify calls for proposals, ILP Cycles, and São Paulo Schools of Advanced Science.

PUBLICATIONS www.fapesp.br/publicacoes

Editorial production (writing, editing, revising, graphic design and art editing) of books, reports, booklets on the research programs funded by FAPESP and other printed and digital materials.
The number of items published in 2022 exceeded 500, including visual identity creations, invitations, advertisements, PowerPoint presentations, folders, certificates, booklets, flyers, materials for science diffusion events and programs, and the Annual Report on the activities of FAPESP in Portuguese and English.

VIRTUAL LIBRARY (BV) bv.fapesp.br

- 3,640,155 visits in 2022.
- 6,042,944 pageviews in the year.
- 271,156 registros records on grants, scholarships and fellowships funded by FAPESP between 1992 and 2020, not including grants, scholarships and fellowships for the period 1962-91.
- 39,500 records on research projects available in the retrospective database (1962-91).
- More than 195,000 scientific and academic publications associated with research projects funded by FAPESP.

bv-cdi fapesp

Source: Google Analytics, BV Log (Admin System), Retrospective Database of Research Projects Supported by FAPESP, 1962-91.

INDICATORS OF SCIENCE, TECHNOLOGY AND INNOVATION IN SÃO PAULO

In 2022, FAPESP's Studies and Indicators Unit (GEI) executed the following activities

PRIMARY DATA PRODUCTION

- Production of R&D expenditure indicators and estimates of numbers of researchers in 2020 based on results of second collection of information regarding expenditure on R&D and personnel dedicated to R&D in São Paulo State.
- Production of indicators on forms of support to which companies funded by Innovative Research in Small Business Program (PIPE) have had access throughout their history and their recent sources of funding, based on a primary survey of these companies.
- Development of a tool to identify partnerships in scientific publications between universities and companies in the field of artificial intelligence.

UPDATING AND ORGANIZATION OF SECONDARY DATA

- Updating and organization of microdata from the National Industrial Property Institute (INPI) for invention patent applicants and applications.
- Updating and organization of microdata from CAPES for faculty and students in graduate studies programs throughout Brazil.
- Organization of FAPESP's administrative records for use in calculating ST&I and institutional performance indicators.
- Collection and organization of information on public funding for R&D.

ORGANIZATION OF REGISTRATION DATABASES

- Higher education and research institutions in the São Paulo State ST&I System (updated).
- Companies funded by PIPE (updated).

ACTIVITIES RELATING TO TECHNICAL COOPERATION AGREEMENTS

- INPI – – study entitled "Patents in São Paulo: applications, applicants and partnerships".
- Seade Foundation:
  - Updating of FAPESP's active relationships with institutions engaged in scientific and technological activities and with innovative companies, complemented by information from other registers;
  - Methodological development on investment in R&D in regional accounts system: analysis of the case of São Paulo State (in progress);
  - Development of data intelligence applications to the Innovative Research in Small Business Program (PIPE) (in progress and in partnership with FAPESP's Scientific Directorate);

  - Proposing of organizational guidelines and physical and human resources required to enhance the efficiency of FAPESP's Indicators Unit in production of studies and indicators.

- CNPq – extraction of data from the Lattes platform and discussion of scope expansion to exchange information and plan studies of common interest.
- CAPES – discussions about establishing a technical cooperation agreement to exchange information and plan studies of common interest.
- Department of Budget and Administration – exchange of information on funding, execution and results of scientific and technological research projects conducted in São Paulo State and activities of common interest.
- Ministry of Labor and Social Security – access to identified data in RAIS employment report database (under discussion).

ROUTINE ACTIVITIES OF GEI

- Production of studies for the Data section published monthly in Pesquisa FAPESP magazine.
- Development and updating of FAPESP's indicator site, in collaboration with the Communication Unit.
- Development of a Database Management System (SGBD) in collaboration with the Information Technology Unit.
- Production of indicators for the Department of Budget and Administration's 2020-23 Multiyear Plan Monitoring System relating to Program 1044 – Development of Science and Technology, and its deliverables.
- Responses to FAPESP's external and internal requirements.

OTHER ACTIVITIES

- Follow-up of impact studies for FAPESP's activities in selected studies relating to commemorations of FAPESP's 60th anniversary, in partnership with the Department of Science and Technology Policy, and the Institute of Geosciences, State University of Campinas (LAB-GEOPI-UNICAMP).

CHAPTER

4

OVERVIEW OF SCHOLARSHIPS, FELLOWSHIPS AND GRANTS

The preceding chapters present indicators according to a segmentation based on funding strategies.

This chapter presents the same data in a manner that provides an overview of total disbursement, new scholarships, fellowships and grants of all types contracted for in 2022, and a breakdown by funding strategy.

OVERVIEW OF SCHOLARSHIPS/FELLOWSHIPS – DISBURSEMENT

TABLE 41

SCHOLARSHIPS/FELLOWSHIPS[1] – DISBURSEMENT IN 2022 ($ PPP)

By types or program and funding strategies

Types \ Funding strategies	Training of Human for Research	Basic and Applied Research		Research for Innovation	Research on Strategic Themes	Commun. Science to the Public	Support for Research Infrastruct.	Total [1]
		Long Term	Regular Grants					
Regular Scholar/Fellowships	**56,355,583**	**1,288,437**	**60,741,506**	**3,346,361**	**7,334,192**		**18,526**	**129,084,605**
Scientific Initiation (SI)	6,165,126		1,971,186	59,909	219,114			**8,415,335**
Master's (MS)	5,506,367		2,846,631	213,865	403,021			**8,969,884**
Doctorate (DR)	21,179,533		9,852,545	668,640	1,166,334			**32,867,052**
Direct Doctorate (DD)	4,855,600		7,019,617	143,583	531,870			**12,550,670**
Postdoctorate (PD)	18,537,177	1,288,437	39,051,527	2,260,364	5,013,853		18,526	**66,169,884**
APLVC Program [2]	111,780							**111,780**
Regular Scholarships/ Fellowships Abroad	**25,854,443**		**18,980,437**	**804,954**	**2,134,074**			**47,773,908**
Research Fellowships Abroad (RFE) - PD	4,851,289		684,523	128,923	277,437			**5,942,172**
Research Internships Abroad (RIA)	21,003,154		18,295,914	676,031	1,856,637			**41,831,736**
RIA – SI	1,001,780		217,766	-	35,500			**1,255,046**
RIA – MS	1,699,298		684,538	50,324	182,567			**2,616,727**
RIA – DR	8,892,848		4,408,064	43,145	485,740			**13,829,797**
RIA – DD	2,091,260		2,325,817	134,848	58,100			**4,610,025**
RIA – PD	7,317,968		10,659,730	447,714	1,094,730			**19,520,142**
Subtotal	**82,210,026**	**1,288,438**	**79,721,943**	**4,151,313**	**9,468,267**		**18,526**	**176,858,513**
Fellowships – Training		**1,740,534**	**2,862,547**	**3,281,050**	**1,061,486**	**42,871**	**63,266**	**9,051,754**
Technical Trainning		1,728,542	2,669,700	3.281.050	941,031	42,871	31,258	**8,694,452**
Technical Trainning – Course		11,992						**11,992**
Scientific Journalism			192,847		120,455		32,008	**345,310**
Research Fellowships (Programs)			**3,204,845**	**5,160,795**	**699,517**			**9,065,157**
PE				5,160,795	7,468			**5,168,263**
Public Education					54,516			**54,516**
Young Investigator					51,927			**51,927**
BIOEN					174,857			**174,857**
BIOTA					25,165			**25,165**
Global Climate Change			35,061		147,733			**182,794**
e-Science			3,169,784		237,851			**3,407,635**
Total	**82,210,026**	**3,028,972**	**85,789,335**	**12,593,158**	**11,229,270**	**42,871**	**81,792**	**194,975,424**

(1) Encompasses all scholarships and fellowships, both associated and unassociated with grants. Small differences in subtotals may occur due to rounding. (2) Aristides Pacheco Leão Program to Stimulate Scientific Vocations.

OVERVIEW OF SCHOLARSHIPS/FELLOWSHIPS – CONTRACTED FOR

TABLE 42 SCHOLARSHIPS/FELLOWSHIPS[1] – NUMBER OF PROJECTS CONTRACTED FOR IN 2022

By types or program and funding strategies

Types \ Funding strategies	Training of Human for Research	Basic and Applied Research		Research for Innovation	Research on Strategic Themes	Commun. Science to the Public	Support for Research Infrastruct.	Total [1]
		Long Term	Regular Grants					
Regular Scholar/Fellowships	**2,598**	**22**	**1,348**	**72**	**165**			**4,205**
Scientific Initiation (SI)	1,465		503		56			**2,024**
Master's (MS)	389		174	14	21			**598**
Doctorate (DR)	406		171	12	23			**612**
Direct Doctorate (DD)	101		152	5	6			**264**
Postdoctorate (PD)	203	22	348	41	59			**673**
APLVC Program [2]	34							**34**
Regular Scholarships/ Fellowships Abroad	**704**	**0**	**428**	**17**	**68**	**0**	**0**	**1,217**
Research Fellowships Abroad (RFE) - PD	120		22	4	9			**155**
Research Internships Abroad (RIA)	584		406	13	59			**1,062**
RIA – SI	82		19		3			**104**
RIA – MS	95		45	1	11			**152**
RIA – DR	245		124	4	20			**393**
RIA – DD	64		77	2	3			**146**
RIA – PD	98		141	6	22			**267**
Subtotal	**3,302**	**22**	**1,776**	**89**	**233**			**5,422**
Fellowships – Training		**310**	**279**	**285**	**140**	**7**	**9**	**1,030**
Technical Trainning		309	270	269	133	7	8	**996**
Participation Course		1		16				**17**
Scientific Journalism			9		7		1	**17**
Research Fellowships (Programs)			**23**	**122**	**53**			**198**
PE				122	1			**123**
BIOEN					1			**1**
BIOTA					1			**1**
Public Education			8		48			**56**
Young Investigator			15		2			**17**
Total	**3,302**	**332**	**2,078**	**496**	**426**	**7**	**9**	**6,650**

(1) Encompasses all scholarships and fellowships, both associated and unassociated with grants.

OVERVIEW OF GRANTS – DISBURSEMENT

TABLE 43

GRANTS – DISBURSEMENT IN 2022 ($ PPP)

By types or program and funding strategies

Types \ Funding strategies	Basic and Applied Research		Research for Innovation	Research on Strategic Themes	Support for Research Infrastructure	Communicating Science to the Public	Total
	Long-term research	Regular Grants not associated to other grants					
Research Grants – Regular[3]	**2,212,071**	**59,242,842**	**108,233**	**229,588**		**7,410,256**	**69,202,991**
Research Grants (Programs)	**95,082,059**		**23,417,141**	**22,009,342**	**50,214,816**		**190,723,358**
Thematic	54,101,690						
Special Projects	428,990						
SPEC	2,174,001						
Young Investigators – Phase 1	12,048,027						
Young Investigators – Phase 2	4,232,114						
RIDC	21,633,052						
PITE							
PIPE							
ERC/ARC							
Intellectual Property (PAPI/Nuplitec)							
BIOTA	462,755						
BIOEN	1,431						
Global Climate Change							
eScience/Data Science							
Institutional Development Plan for State Research Institutions (PDIp)							
Public Policies (PPP)							
Public Education							
Science for Development Centers							
Multi-user Equipment							
Equipment Repair							
REDNESP							
Overhead – Institutional Research Infrastructure							
Overhead – Program Coordinator							
Overhead – REDNESP							
Research Grants Subtotal	**97,294,130**	**59,242,842**	**23,525,374**	**22,238,930**	**50,214,816**	**7,410,256**	**259,926,348**
Innovation Districts (FIPE)			2,477,550				
Others (contracts)							
Total	**97,294,130**	**59,242,842**	**26,002,924**	**22,238,929**	**50,214,816**	**8,418,455**	**263,412,098**

(3) Regular research grants comprise Research Grants – Regular, Grants for Meeting Organization, Grants for Participation in Meetings, Publication Grants, and Visiting Researcher Awards. Small differences in subtotals may occur due to rounding.

OVERVIEW OF GRANTS – CONTRACTED FOR

TABLE 44

GRANTS – NUMBER OF PROJECTS CONTRACTED FOR IN 2022

By types or program and funding strategies

Types \ Funding strategies	Basic and Applied Research		Research for Innovation	Research on Strategic Themes	Support for Research Infrastructure	Communicating Science to the Public	Total
	Long-term research	Regular Grants not associated to other grants					
Research Grants – Regular[3]	**95**	**1,294**	**8**	**8**		**4**	**1,409**
Research Grants (Programs)	**110**	**0**	**220**	**62**	**269**	**0**	**661**
Thematic	54						**54**
Special Projects	1						**1**
SPEC	3						**3**
Young Investigators – Phase 1	25			2			**27**
Young Investigators – Phase 2	26			4			**30**
PITE			3	1			**4**
PIPE			207	1			**208**
ERC/ARC			7				**7**
BIOTA				15			**15**
BIOEN	1			13			**14**
Global Climate Change				4			**4**
eScience/Data Science				1			**1**
Public Policies (PPP)				2			**2**
Public Education				3			**3**
Science for Development Centers				16			**16**
Multi-user Equipment			3		80		**83**
Equipment Repair					74		**74**
Overhead – Institutional Research Infrastructure					108		**108**
Overhead – Program Coordinator					3		**3**
Overhead – REDNESP					4		**4**
Total	**205**	**1,294**	**228**	**70**	**269**	**4**	**2,070**

(4) Regular research grants comprise Research Grants – Regular, Grants for Meeting Organization, Grants for Participation in Meetings, Publication Grants, and Visiting Researcher Awards.

CHAPTER

5

PARTNERSHIPS FOR RESEARCH COLLABORATION AND CO-FUNDING

- Partnership
- Institutional funding instruments
- Partnerships with higher education and research institutions
- Research funding agencies and bodies
- Companies
- Amazonia +10 Initiative
- FAPESP Week
- Most frequent destinations and origins of scholarship/fellowship awardees in 2022
- Map of cooperation with funding agencies and academic organizations
- Map of research collaboration with companies

PARTNERSHIPS

FAPESP promotes research collaboration in Brazil and abroad to strengthen and broaden the domestic and global impact of the science produced in São Paulo State.

As well as fostering collaboration by means of institutional instruments in a continuous flow, FAPESP enters into co-funding agreements with higher education and research institutions, funders, and companies.

Some agreements require the partner organization to transfer its share of the funding to FAPESP in order for disbursement to happen. Others call for the partner to transfer its share of funding directly to the institution that will host the research project supported.

In 2022

3,771 collaborative research projects;

$ PPP 42.1 million to 1,922 co-funded projects;

$ PPP 54.6 million to 1,849 projects supported solely by FAPESP.

TABLE 45

DOMESTIC AND INTERNATIONAL PARTNERSHIPS FOR RESEARCH COLLABORATION AND CO-FUNDING

Disbursement, number of active projects and new projects contracted in 2022, including scholarships/fellowships and grants associated

Collaborative research/ type partner organization	Disbursement from FAPESP ($ PPP)	Active projects	New project contracted
Institutional funding instruments(1)	54,641,417	1,849	1,651
Higher education and research institutions(2)	2,921,781	207	51
Research funding agencies(3)	30,992,040	1,498	518
Companies(4)	8,221,995	217	154
Total	**96,777,233**	**3,771**	**2,374**

(1) Disbursement by FAPESP for projects funded via continuous flow institutional instruments, in Brazil and abroad.
(2) Disbursement by FAPESP for projects co-funded by higher education institutions and scientific and technological research institutions.
(3) Disbursement by FAPESP for projects co-funded by international and multilateral funding agencies and by domestic partners: CAPES, CNPq, FINEP, MCTI, FAP, São Paulo State Department of Government, SEADE Foundation, and others.
(4) Disbursement by FAPESP for projects co-funded by Brazilian and foreign companies.

INSTITUTIONAL FUNDING INSTRUMENTS

In 2022, FAPESP disbursed $ PPP 54.6 million to fund 1,849 projects supported by its institutional funding instruments. Out of this total, $ PPP 41.8 million went to Research Internships Abroad (RIA) ranging from scientific initiation to postdoctoral; $ PPP 5.9 million to Research Fellowships Abroad (RFA) at the postdoctoral level; $ PPP 1.08 million to grants for visits by researchers from abroad to São Paulo to deliver courses or contribute to research groups; and $ PPP 1.2 million to grants for participation by researchers from São Paulo in scientific meetings held abroad.

Funding for visits by researchers from other parts of Brazil and participation in or organization of scientific meetings in Brazil accounted for a further $ PPP 4.5 million.

TABLE 46

CONTINUOUS FLOW INSTITUTIONAL INSTRUMENTS (PROJECTS FUNDED SOLELY BY FAPESP)

Disbursement, number of active projects and new projects contracted in 2022, including scholarships/fellowships and grants associated

Funding Strategies	Disbursement $ PPP	Active projects	New projects contracted
Domestic scientific exchange	**4,547,813**	**192**	**192**
Basic and Applied Research	4,474,535	189	190
Research on Strategic Themes	73,278	3	2
Cross-border scientific exchange	**50,093,604**	**1,657**	**1,459**
Training of Human Resources for Research	25,854,443	827	704
Basic and Applied Research	21,222,298	734	662
Research on Strategic Themes	2,135,511	68	70
Research for Innovation	881,352	28	23
Total	**54,641,417**	**1,849**	**1,651**

PARTNERSHIPS WITH HIGHER EDUCATION AND RESEARCH INSTITUTIONS

FAPESP has stepped up research collaboration by issuing joint calls for proposals with higher education and research institutions in Brazil and abroad. Research funding is shared between the parties in these cases. In 2022, 86 cooperation agreements – three signed in the year – were active with 83 foreign and three domestic institutions, and 207 projects with 48 foreign institutions were in progress under these agreements. Most involved Regular Research Grants, and 51 were contracted for during the year. FAPESP's contribution to the funding for projects executed under these agreements amounted to $ PPP 2.9 million, with partner institutions contributing matching amounts.

In 2022, joint calls were issued with three foreign universities: University of the Frontier (UFRO), Chile; Emory University, USA; and University of Antioquia (UdeA), Colombia. The list of partners and a map showing where the organizations are located on all continents are on pages 157 a 161.

TABLE 47

PARTNERSHIPS WITH HIGHER EDUCATION AND RESEARCH INSTITUTIONS – BY FUNDING STRATEGY

Disbursement, number of active projects and new projects contracted in 2022, including scholarships/fellowships and grants associated

Funding Strategies	Disbursement $ PPP	Active projects	New projects contracted
Cross-border partnerships			
Basic and Applied Research	2,800,824	190	47
Research on Strategic Themes	105,347	13	3
Research for Innovation	15,504	4	1
Training of Human Resources for Research	106	0	0
Total	**2,921,781**	**207**	**51**

RESEARCH FUNDING AGENCIES

In 2022, 78 research co-funding agreements with other agencies and funders were active. Four were signed during the year; 53 of the agreements are with foreign funders and 25 with Brazilian funders, while 18 agreements are with multilateral agencies, and eight with domestic research funding associations, one of which was signed in 2022.

In Brazil, FAPESP's main partners are CAPES, the Ministry of Education's Higher Research Council, which supplies funding for FAPESP to award master's to postdoctoral scholarships and fellowships; FINEP, the Brazilian Innovation Agency, for joint maintenance of the PIPE/PAPPE Grant and Tecnova programs; and the National Council for Scientific and Technological Development (CNPq), in federal initiatives in São Paulo State such as National Institutes of Science and Technology (NISTs), Research for the SUS (PPSUS), the Long-Term Ecological Research Program (LTER), and the Training in Taxonomy Program (Protax), among others.

In the same period, agreements with the Ministry of Science, Technology and Innovation (MCTI) and the Brazilian Internet Steering Committee (CGI.br) remained in effect. One of these agreements supports research projects that contribute to the development of the internet in Brazil. The other supports the creation of Applied Research Centers in Artificial Intelligence (*see pp. 95 to 98*). In São Paulo, FAPESP is also responsible for execution of the Centelha program ("Spark"), an initiative implemented in 26 states by MCTI and FINEP in partnership with CNPq, the National Council of State Research Agencies (CONFAP) and CERTI Foundation.

FAPESP also supports research projects in partnership with several state funding agencies (FAPs), including the Amazon+10 Initiative (*see pp. 140-143*); SEADE Foundation; the Brazilian Small Business Support Service (SEBRAE); Maria Cecilia Souto Vidigal Foundation; Jô Clemente Institute (ex-APAE); the São Paulo State Government, via the Pitch Gov.SP program to help startups develop solutions for the public sector and the Science for Development Center (SDC) program; the Brazilian Industrial Research and Innovation Corporation (Embrapii); and the São Paulo State Department of Infrastructure and Environment (SIMA).

FAPESP's contribution to co-funding agreements with foreign partners totaled $ PPP 13.8 million, and its contribution to agreements with domestic researcher funders amounted to $ PPP 17.1 million. The total transferred to FAPESP by partners to trigger its disbursement was $ PPP 5.5 million. In the other cases, where transfers are made directly to the institution hosting the project supported, FAPESP and its partners disbursed similar amounts. The list of partners and a map showing where the organizations are located on all continents are on pages 145-147.

In 2022, 16 cross-border calls for proposals were issued with the following foreign partners: French National Research Agency (ANR), European Research Council (ERC), Eureka, Swedish Agency for Innovation Systems (Vinnova), Spanish Center for the Development of Industrial Technology (CDTI), German Federal Ministry of Education and Research (BMBF), Dutch Research Council (NWO), Fulbright, Georgetown University, Japan Science and Technology Agency (JST), Belmont Forum, UK Academies, M-ERA.NET, Institut Pasteur, German Academic Exchange Service (DAAD), National Research Foundation of Korea (NRF), National Natural Science Foundation of China (NSFC), Czech Science Foundation (GACR), ERA-NET, and Natural Environment Research Council (NERC UK). Besides the proposals approved in response to the calls, six continuous flow proposals were approved, two of which were with each of the following partners: UK Research and Innovation (UKRI), German Research Foundation (DFG), and Swiss National Science Foundation (SNSF). Nineteen calls were issued with Brazilian partners.

TABLE 48

PARTNERSHIPS WITH FUNDING AGENCIES – BY FUNDING STRATEGY

Disbursement, number of active projects and new projects contracted in 2022, including scholarships/fellowships and grants associated

Funding Strategies	Disbursement $ PPP	Active projects	New projects contracted
Domestic partnerships	**17,140,606**	**929**	**352**
Basic and Applied Research	11,214,227	632	212
Training of Human Resources for Research	462,715	33	0
Research for Innovation	3,560,720	179	123
Research on Strategic Themes	739,181	70	17
Support for Research Infrastructure	1,163,763	15	0
Cross-border partnerships	**13,851,434**	**569**	**166**
Basic and Applied Research	11,302,146	465	128
Training of Human Resources for Research	85,734	2	0
Research for Innovation	386,293	11	1
Research on Strategic Themes	2,077,261	91	37
Total	**30,992,040**	**1,498**	**518**

COMPANIES

In 2022, 27 companies funded scientific and technological research in partnership with FAPESP, 17 of them under the aegis of the Research Partnership for Technological Innovation Program (PITE) and 10 via Engineering Research Centers/Applied Research Centers (ERCs/ARCs). FAPESP allocated $ PPP 5.9 million to 145 research projects in progress at ERCs and ARCs during the year, and contracted for 134 new projects.

The ERC/ARC Program requires partner companies to match FAPESP's investment in funding during the life of the agreement, while host institutions match both in the form of laboratory and other infrastructure, salaries for researchers and support personnel etc.

In addition, 17 other companies are co-funding research via PITE. In 2022, 72 projects were ongoing for a total of $ PPP 2.2 million and 34 newly contracted for in the two modalities of the program, PITE Agreements and PITE Spontaneous Demand (*see p. 104*).

FAPESP's percentage share of PITE co-funding depends on the degree of innovation in the proposals and the associated technological risks, ranging from 20% to 70% of the budget. A list of co-funding companies can be seen on pages 166-167.

TABLE 49

PARTNERSHIPS WITH DOMESTIC AND FOREIGN COMPANIES – BY FUNDING STRATEGY

Disbursement, number of active projects and new projects contracted in 2022, including scholarships/fellowships and grants associated

Funding Strategies	Disbursement $ PPP	Active projects	New projects contracted
Research for Innovation – Local partnerships	**4,091,450**	**132**	**122**
ERC/ARC	2,414,544	78	103
PITE Agreements	629,532	34	16
PITE Spontaneous Demand	1,047,374	20	3
Research for Innovation – Foreign partnerships	**4,130,545**	**85**	**32**
ERC/ARC	3,570,929	67	31
PITE Agreements	559,616	18	1
Total	**8,221,995**	**217**	**154**

DISBURSEMENT BY FAPESP AND PARTNER COMPANIES FOR ERC/ARC – 2022

In 2022, three ERCs established in 2021 and 2022 began operating in partnership with the following institutions:

ERC	Partner company	Partner HE/research institution
Shell Brasil-FAPESP Paulo Offshore Innovation Center (OIC)	Shell	Engineering School, University of São Paulo (Poli-USP)
Center for Plant Molecular Improvement	EMBRAPA	Center for Molecular Biology and Genetic Engineering, State University of Campinas (CBMEG-UNICAMP)
Center for Research in for Immuno-Oncology (CRIO)	GSK	Albert Einstein Jewish-Brazilian Institute Education and Research (IIEPAE)

Over the next five to ten years, investment in the three new centers is projected to reach $ PPP 166,422,013, of which $ PPP 38,436,202 will be disbursed by FAPESP and $ PPP 38,856,544 by the partner companies, with higher education and research institutions contributing $ PPP 89,129,266 in researchers' and support workers' salaries, facilities, equipment and infrastructure.

Ten companies co-fund 17 of the 18 ERCs set up by 2022: Peugeot Citroën (1), GSK (4), Shell (4), Embrapa (2), Equinor (1), Grupo São Martinho (1), Koppert (1), IBM (1), Ericsson (1) and Braskem (1). An ARC was established in partnership with Maria Cecilia Souto Vidigal Foundation. In addition, six ARCs in artificial intelligence are partnerships with the Ministry for Science, Technology and Innovation (MCTI) and the Brazilian Internet Steering Committee (CGI.br), among others.

The total amount of committed funding for the 18 ERCs and ARCs, as well as the six ARCs in AI, established by 2022 (including those that will begin doing research in 2023) is $ PPP 612,194,213, with FAPESP contributing $ PPP 148.5 million, partner companies $ PPP 153.3 million, HE and research institutions $ PPP 302.5 million , and other sources $ PPP 7.9 million.

Three ERCs established in 2022 will begin conducting research in 2023:

- **FAPESP Process 21/00199-8** – Smart Networks and Services for 2030 ERC (Smartness), partnership with Ericsson hosted by the State University of Campinas's School of Electrical Engineering and Computing (FEEC-UNICAMP);
- **FAPESP Process 21/11258-5** – ERC for Aerial Mobility of the Future (ERC-AMF), partnership with Embraer hosted by the Aeronautical Technology Institute (ITA);
- **FAPESP Process 21/05251-8** – Plasticulture Research Center, partnership with Braskem hosted by UNICAMP's Interdisciplinary Hub for Energy Planning (NIPE).

Four ARCs in artificial intelligence selected in 2022 under the partnership with MCTI and CGI.br will start conducting research in 2023:

- **FAPESP Process 20/09706-7** – Reference Center in Artificial Intelligence (CeReIA), partnership with Hapvida NotreDame Intermédica hosted by the Federal University of Ceará (UFC);
- **FAPESP Process 20/09835-1** – Artificial Intelligence Recreating Environments (IARA), partnership with Fiat Chrysler Automóveis Brasil, Intel Semicondutores, Máquinas Agrícolas Jacto and Splice Indústria, Comércio e Serviços hosted by the University of São Paulo's Institute of Mathematics and Computer Science (ICMC-USP) in São Carlos;
- **FAPESP Process 20/09770-7** – Center of Excellence in Applied Research on Artificial Intelligence for Industry hosted by SENAI Cimatec in Bahia;
- **FAPESP Process 20/09850-0** – ARC in Artificial Intelligence for the Evolution of Manufacturing to Industry 4.0 hosted by the Technological Research Institute (IPT).

Four companies transferred a total of $ PPP 503,875 to FAPESP under the PITE Program as their contributions to projects: they were Agilent, IBM Brazil, Microsoft and SABESP. The others transferred funds directly to the host institutions.

AMAZÔNIA +10 INITIATIVE

Amazon+10 is an initiative of the National Council of State Research Foundations (CONFAP) to support research and technological innovation in the Amazon, promote sustainable and inclusive development in the region, and foster interaction between nature and society.

The initiative aims to promote convergent ST&I activities that strengthen the guidelines and propositions established by the Strategic Plan for the Sustainable Development of Amazonia (Plano Amazônia Sustentável, PAS), surmounting obstacles, seizing opportunities for reafforestation of degraded areas, undertaking agricultural activities with low greenhouse gas emissions, adding value to the bioeconomy's production chains, producing food, drugs and clean energy, and guaranteeing access to basic services for the people who live in the region.

Created in November 2021, when FAPESP issued a communication announcing the mission and multilateral nature of the venture, the initiative was initially backed by FAPESP and the nine states of the Amazon region. By the time the first call for proposals was issued on June 24, 2022, it had been joined by research funding agencies (FAPs) in 20 states: São Paulo, Amazonas, Rio de Janeiro, Pará, Paraná, Maranhão, Mato Grosso, Rio Grande do Sul, Amapá, the Federal District, Alagoas, Goiás, Paraíba, Pernambuco, Rondônia, Espírito Santo, Piauí, Santa Catarina, Acre and Tocantins.

OBJECTIVES

1. Identify a wide array of concrete research challenges requiring solutions to real problems of the region;
2. Fund research that helps produce science- and technology-based solutions to real problems of society;
3. Strengthen the regional and intraregional ST&I infrastructure through training and attraction of highly qualified human resources to the region;
4. Fund collaborative research that demonstrates the involvement of local actors (civil society, ordinary citizens, leaders, government technicians and/or private enterprise) in the identification and prioritization of problems and potential solutions;
5. Mobilize local researchers and outside partners to pursue science- and technology-based solutions to problems of the region;

6. Integrate the scientific and traditional knowledge of the region produced to date;
7. Engage the local community in the Initiative by building an approach that focuses on its ultimate beneficiaries;
8. Give back know-how to communities in the region, in accordance with the principles of open science;
9. Widely communicate the results of funded research projects to Brazilian researchers in Brazil and abroad, public and private research funders in Brazil and abroad, private-sector companies that operate in the region, international investment funds, local governments, NGOs with activities in the region, regional, national and international media, and society in general.

PRIORITY RESEARCH AREAS

- Biodiversity
- Climate change
- Bioeconomy and biotechnology
- Improvements to the living conditions of the region's population
  - Family farming
  - Traditional communities
- Land use
  - Deforestation
  - Fire
  - Mining
  - Conservation units
  - Land regularization
  - Green technologies

For the purposes of the Initiative's activities, these research areas will be organized into groups in accordance with the overarching logic of a sustainable transition, as follows:

- GROUP 1
  Territories with infrastructure and logistics that facilitate multiscale sustainable development.
- GROUP 2
  Inhabitants of Amazonia as protagonists of knowledge of biodiversity and its valorization and of adaptation to climate change.
- GROUP 3
  Strengthening of sustainable production chains by the Amazonians.

LINES OF ACTION

The following lines of action will be observed in the multilateral agreements and will serve as indications for institutional partnerships and donations:

Strategic projects

High-impact applied research projects, commissioned or not, of interest to at least three FAPs in different states of the North and FAPs in other regions that allocate funds to the Initiative.

Calls for proposals

Competitive biddings for funding to support research on subjects selected by the Executive Committee and involving at least three FAPs in different states of the North and FAPS in other regions that allocate funds to the Initiative.

Innovation and prototyping

Research projects on the Amazon region with the potential to contribute to public policy making and orient public and private investment that will help surmount the obstacles to full use of the region's resources. This line of action will aim to close the gap between science and technological development by fostering knowledge transfer and corporate innovation, especially by tech startups.

Mobility

This line of action supports short- and medium-term research internships for secondary school students, undergraduates and graduates who wish to do part of their research at higher education and research institutions in Legal Amazonia. The cost of these exchanges can be borne by FAPs in the states that are participating in the Initiative, as well as public and private partners. Attraction of foreign students and researchers to institutions in the Amazon region is particularly important.

Regional ST&I infrastructure

This line of action strengthens the regional research infrastructure by supporting ST&I and higher education institutions in Legal Amazonia, where ST&I infrastructure is generally insufficient owing to a lack of funds for new investment and/or a lack of resources for proper

maintenance and conservation of existing equipment. Funding and installation activities of particular interest to strengthen ST&I institutions in the region and reposition them as leading biotechnology centers include the following priorities: (1) physical and virtual repositories of Amazonian biodiversity; (2) libraries of natural compounds extracted from biodiversity; (3) data centers for development of biotechnology; and (4) laboratories for identifying and researching natural active principles.

Support for scientific expeditions

Funding of research expeditions to document biodiversity and its relations with society in the Brazilian Amazon.

FIRTS CALL

The Amazon+10 Initiative's first call for proposals, issued in June 2022 by CONFAP, mobilized more than 500 researchers in 20 Brazilian states. Of the 152 proposals submitted to the respective FAPs, 97 complied with the requirements of the call and were selected for assessment. The 39 proposals selected were announced on November 17. FAPs in 18 states and the Federal District will invest $ PPP 16.2 million, and CNPq will invest $ PPP 4.7 million in grants to support research projects in the states of Legal Amazonia.

The call notice required each proposal to have principal investigators in at least three states, represented by the FAPs engaged in the Initiative. At least one PI must be affiliated with a higher education or research institution in Legal Amazonia or with a company in the region.

The selected research projects focus on developing solutions in three priority areas: territory, peoples of the Amazon, and strengthening of sustainable supply chains.

The list of approved projects is at **www.fapesp.br/15774**.

A recording of the event at which the 39 projects were announced can be watched on Agência FAPESP's YouTube channel at **www.youtube.com/watch?v=inlJHoDE1_I**.

FAPESP WEEK

FAPESP Week did not take place in 2020 or 2021 because of the COVID-19 pandemic. Since 2011, FAPESP Week scientific symposia have helped create an environment for scientific collaboration between Brazilian and foreign researchers with shared or complementary interests.

FAPESP WEEK HELD – 2011 TO 2019

2011 – **UNITED STATES** – Washington, D.C.

2012 – **CANADA** – Toronto; **SPAIN** – Salamanca, Madri; **UNITED STATES** – Washington, D.C., Morgantown (West Virginia), Cambridge (Massachusetts)

2013 – **UNITED STATES** – Charlotte, Chapel Hill, Raleigh (North Carolina); **ENGLAND** – London; **JAPAN** – Tokyo

2014 – **GERMANY** – Munique; **CHINA** – Pequim; **UNITED STATES** – Berkeley, Davis (California)

2015 – **ARGENTINA** – Buenos Aires; **SPAIN** – Barcelona; **BRAZIL** – São Paulo

2016 – **UNITED STATES** – Michigan, Ohio; **URUGUAY** – Montevideu

2017 – **UNITED STATES** – Nebraska, Texas

2018 – **BELGIUM** – Bruxelas, Liège, Lovaina; **UNITED STATES** – New York

2019 – **ENGLAND** – London; **FRANCE** – Lyon, Paris

MOST FREQUENT DESTINATIONS AND ORIGINS IN 2022

DESTINATIONS OF 1,062 RIA AWARDEES

Europe	627
North America	384
Latin America and Caribe	22
Oceania	22
Asia	6
Africa	1

PARTICIPATION IN 177 SCIENTIFIC MEETINGS

Europe	107*
North America	42
Latin America and Caribe	13
Asia	12
Oceania	3

DESTINATIONS OF 155 RFA AWARDEES

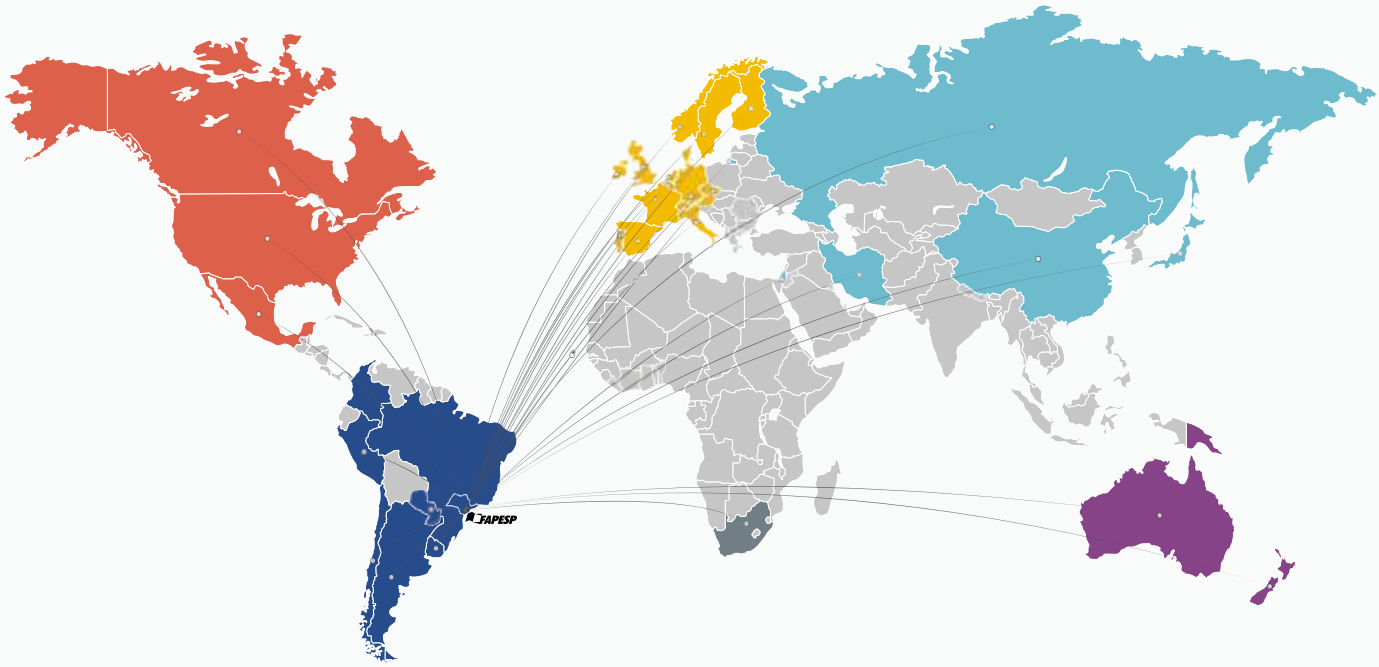
Europe	96
North America	52
Oceania	4
Asia	2
Latin America and Caribe	1

ORIGIN OF 67 VISITING RESEARCHERS

Europe	50
Latin America and Caribe	6
North America	5
Asia	4
Oceania	1
Africa	1

* Two meeting organization

FUNDING AGENCIES AND ACADEMIC ORGANIZATIONS



ACADEMIC ORGANIZATIONS:
– 86 active agreements with 83 foreign institutions and 3 local institutions.

FUNDING AGENCIES:
– 104 active agreements with 78 agencies (53 foreign and 25 local), 18 multilateral agencies and 8 local associations.

The organizations and companies with which FAPESP had agreements in 2022 are listed on the next page and on pp. 160-161 respectively.

AFRICA
3 organizations of 3 countries

NORTH AMERICA
32 organizations of 3 countries

SOUTH AMERICA
41 organizations of 6 countries

ASIA
13 organizations of 6 countries

EUROPE
83 organizations of 17 countries

OCEANIA
10 oorganizations of 2 countries

AGENCIES AND ACADEMIC INSTITUTIONS IN 2022

AFRICA

SOUTH AFRICA
- ❖ National Research Foundation (NRF)

MOZAMBIQUE
- ❖ Fundo Nacional de Investigação (FNI)

NORTH AMERICA

CANADA
- ● Carleton University
- ● Consortium of Alberta, Laval, Dalhousie and Ottawa (Caldo)
- ❖ Fonds de Recherche du Québec (FRQ)
- ❖ International Development Research Centre (IDRC)
- ● McGill University
- ❖ Mitacs
- ❖ New Frontiers in Research Fund (NFRF)
- ❖ Natural Sciences and Engineering Research Council of Canada (NSERC)
- ❖ National Research Council Canada (NRC)
- ● University of Victoria (UVic)

UNITED STATES
- ❖ Bill & Melinda Gates Foundation
- ● Columbia Global Centers
- ● Duke University
- ● Emory University
- ● Fermi Research Alliance (Fermilab) 2020
- ❖ Fulbright (Programa Dra. Ruth Cardoso, em parceria com Georgetown University e Capes)
- ❖ Georgetown University (Programa Dra. Ruth Cardoso, em parceria com Capes e Fulbright)
- ❖ National Science Foundation (NSF)
- ● Purdue University
- ● Texas Tech University (TTU)
- ● Texas A&M University (TAMU)
- ● The Scripps Research Institute
- ● University of California San Diego (UCSD)
- ● University of Central Florida
- ● University of Georgia (UGA)
- ● University of Illinois
- ● University of Maryland
- ● University of Missouri
- ● University of Nebraska – Lincoln
- ● University of North Carolina – Charlotte (UNCC)
- ● University of Virginia (UVA)

MEXICO
- ❖ Conselho Nacional de Ciência e Tecnologia dos Estados Unidos do México (Conacyt)

SOUTH AMERICA

ARGENTINA
- ❖ Consejo Nacional de Investigaciones Científicas y Técnicas (Conicet)

BRAZIL
- △ Associação Brasileira da Indústria de Tecnologia para Saúde (Abimed)
- ❖ Banco Nacional de Desenvolvimento Econômico e Social (BNDES)
- ❖ Centro Alemão de Ciência e Inovação São Paulo (DWIH)
- ❖ Conselho Nacional das Fundações Estaduais de Amparo à Pesquisa (Confap)
- ❖ Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)
- ❖ Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes)
- ❖ Embaixada Britânica
- ● Embrapa Pecuária Sudeste
- ❖ Empresa Brasileira de Pesquisa e Inovação Industrial (Embrapii)
- ❖ Financiadora de Estudos e Projetos (Finep)
- ❖ Fundação de Amparo à Pesquisa do Estado do Amazonas (Fapeam)
- ❖ Fundação de Amparo à Pesquisa e ao Desenvolvimento Científico e Tecnológico do Maranhão (Fapema)
- ❖ Fundação de Amparo à Pesquisa e Inovação do Espírito Santo (Fapes)
- ❖ Fundação de Amparo à Pesq. e Inovação do Estado de Santa Catarina (Fapesc)
- ❖ Fundação de Amparo à Ciência e Tecnologia do Estado de Pernambuco (Facepe)
- ❖ Fundação de Apoio à Pesquisa do Estado da Paraíba (Fapesq)
- ● Fundação Getulio Vargas (FGV)
- ❖ Fundação Maria Cecilia Souto Vidigal
- △ Instituto de Estudos de Saúde Suplementar (IESS)
- △ Instituto Jô Clemente (ex-Apae de São Paulo)
- △ Fundação Sistema Estadual de Análise de Dados (Seade)
- △ Instituto Euvaldo Lodi (IEL/SP)
- ● Instituto Nacional de Pesquisas Espaciais (INPE)
- ❖ Instituto Paulo Gontijo
- ❖ Instituto Serrapilheira
- ❖ Ministério da Ciência, Tecnologia e Inovação (MCTI)
- ❖ Prefeitura Municipal de Jundiaí
- ❖ Sebrae São Paulo
- ❖ Secretaria da Educação do Estado de São Paulo
- ❖ Secretaria de Governo do Estado de São Paulo
- ❖ Secretaria de Infraestrutura e Meio Ambiente (SIMA) do Estado de São Paulo
- ❖ Secretaria Municipal de Inovação e Tecnologia de São Paulo
- ❖ Secretaria Municipal da Saúde da Prefeitura de São Paulo
- △ Sindicato das Empresas de Compra, Venda, Locação e Administração de Imóveis Residenciais e Comerciais de São Paulo (Secovi-SP)
- △ União Nacional da Bioenergia (UDOP)
- △ WWF-Brasil

CHILE
- ❖ Agencia Nacional de Investigación y Desarrollo (ANID)
- ● Universidad de La Frontera
- ● Universidad de Magallanes (UMAG)

COLOMBIA
- ● Universidad de Antioquia
- ❖ Ministério da Ciência, Tecnologia e Inovação (Minciencias)

ASIA

CHINA
- ❖ National Natural Science Foundation of China (NSFC)
- ● Tianjin University (TJU)

SOUTH KOREA
- ❖ National Research Foundation of Korea (NRF)

IRAN
- ❖ Iran National Science Foundation (INSF)

ISRAEL
- ● Hebrew University of Jerusalem
- ❖ Matimop
- ● Weizmann Institute of Science

JAPAN
- ❖ Japan Science and Technology Agency (JST)
- ● University of Tsukuba

SINGAPURE
- ● National University of Singapore

EUROPE

GERMANY
- ❖ Collective Research Networking
- ❖ Deutsche Forschungsgemeinschaft (DFG)
- ❖ German Centre for Research and Innovation São Paulo (DWIH São Paulo)
- ● Fraunhofer-Gesellschaft
- ● Freie Universität Berlin
- ● Friedrich-Alexander-Universität Erlangen-Nürnberg
- ❖ Bavarian State Ministry of Science and the Arts of the Free State of Bavaria (StMWK)

❖ Research funding agencies ● Higher education and research institutions △ Research funding associations

❖ Federal Ministry of Education and Research (BMBF)
❖ German Academic Exchange Service (DAAD)
● Max Planck Society for the Advancement of Science
● Technische Universität München (TUM)
● Technische Universität Berlin (TU Berlin)
● Universität Hamburg
● Universidade de Münster
● Universität Tübingen

AUSTRIA
● University of Natural Resources and Life Sciences
● International Institute for Applied Systems Analysis (IIASA)

BELGIUM
❖ Eureka Network
❖ Fonds de la Recherche Scientifique (F.R.S.-FNRS)
❖ Research Foundation – Flanders (FWO)
❖ Wallonie-Bruxelles International (WBI)

DENMARK
❖ Danish Agency for Science and Higher Education (DAFSHE)
❖ Innovation Fund Denmark (ex-DCSR)
● University of Copenhagen

SPAIN
❖ Centro para el Desarrollo Tecnológico Industrial (CDTI)
❖ Secretaría de Estado de Investigación, Desarrollo e Innovación (Seidi)
● Universidad Miguel Hernández de Elche
● Universidad de Salamanca

FINLAND
❖ Academy of Finland (AKA)

FRANCE
❖ Agence Nationale de la Recherche (ANR)
❖ Centre National de la Recherche Scientifique (CNRS)
● École des Hautes Études en Sciences Sociales (EHESS)
❖ Fondation pour la Recherche sur la Biodiversité (FRB)
● Institut National de la Santé et de la Recherche Médicale (Inserm)
● Sorbonne Université
● Université Grenoble Alpes

NETHERLANDS
● BE-Basic Foundation
● Delft University of Technology
❖ Dutch Research Council (NWO)
● Erasmus Universiteit Rotterdam
● Leiden University
● Eindhoven University of Technology (TU/e)

IRLANDA
❖ Irish Research Council (IRC)

ITALY
❖ Consiglio Nazionale delle Ricerche (CNR)
● Università di Bologna

NORWAY
❖ Research Council of Norway (RCN)

UNITED KINGDOM
❖ British Council/Newton Fund
● Cardiff University
● Coventry University
● Durham University
● Imperial College London
● Keele University
● King's College London
● Queen Mary University of London
● Queen's University Belfast
❖ UK Research and Innovation (UKRI) – BBSRC, Nerc, MRC, ESRC
❖ UK Academies
❖ Royal Academy of Engineering
● University of Bath
● University of Birmingham
● University of Exeter
● University of Glasgow
● University of Leeds
● University of Manchester
● University of Nottingham
● University of Oxford
● University of Southampton
● University of Surrey
● University of Warwick
● University of York

CEZCH REPUBLIC
❖ Czech Science Foundation (GACR)
❖ Technology Agency of the Czech Republic (TA CR)

RUSSIAN
❖ Russian Foundation for Basic Research (RFBR)

SWEDEN
● Karolinska Institutet
● Linköping University
● Lund University
❖ Swedish Research Council
❖ Swedish Governmental Agency for Innovation Systems (Vinnova)
● Uppsala University

SWITZERLAND
❖ Swiss National Science Foundation (SNSF)

OCEANIA

AUSTRALIA
● Australian National University (ANU)
● Australian Technology Network of Universities (ATN)
● Macquarie University
● Monash University
● Queensland University of Technology (QUT)
● University of Queensland (UQ)
● University of Wollongong (UOW)

NEW ZELAND
● Universities New Zealand, Te Pōkai Tara (UNZ)

MULTINATIONAL AGENCIES

■ Belmont Forum (IGFA)
■ Biodiversa+
■ EU-CELAC IG – Cooperação Birregional em Ciência, Tecnologia e Inovação
■ EU-LIFE
■ Earth BioGenome Project (EBP)
■ European Research Council (ERC)
■ Foundation for Food and Agriculture Research (FFAR)
■ Fundo Global para o Meio Ambiente (GEF)
■ Global Alliance for Chronic Diseases (GACD)
■ Global Research Collaboration for Infectious Disease Preparedness (GloPID-R)
■ GMTO Corporation
■ Incobra
■ Inter-American Institute for Global Change Research (IAI)
■ Inter-American Network of Academies of Sciences (IANAS)
■ M-ERA.NET
■ Parceria G3
■ Trans-Atlantic Platform for Social Sciences and Humanities (T-AP)
■ Horizon 2020 (União Europeia)

RESEARCH COLLABORATION WITH COMPANIES

PARTNER COMPANIES

- 10* co-funders of Engineering Research Centers (ERC) and Applied Research (ARC) – Peugeot Citroën, GSK, Shell, Embrapa, Equinor, Grupo São Martinho, Koppert, IBM, Ericsson and Braskem:

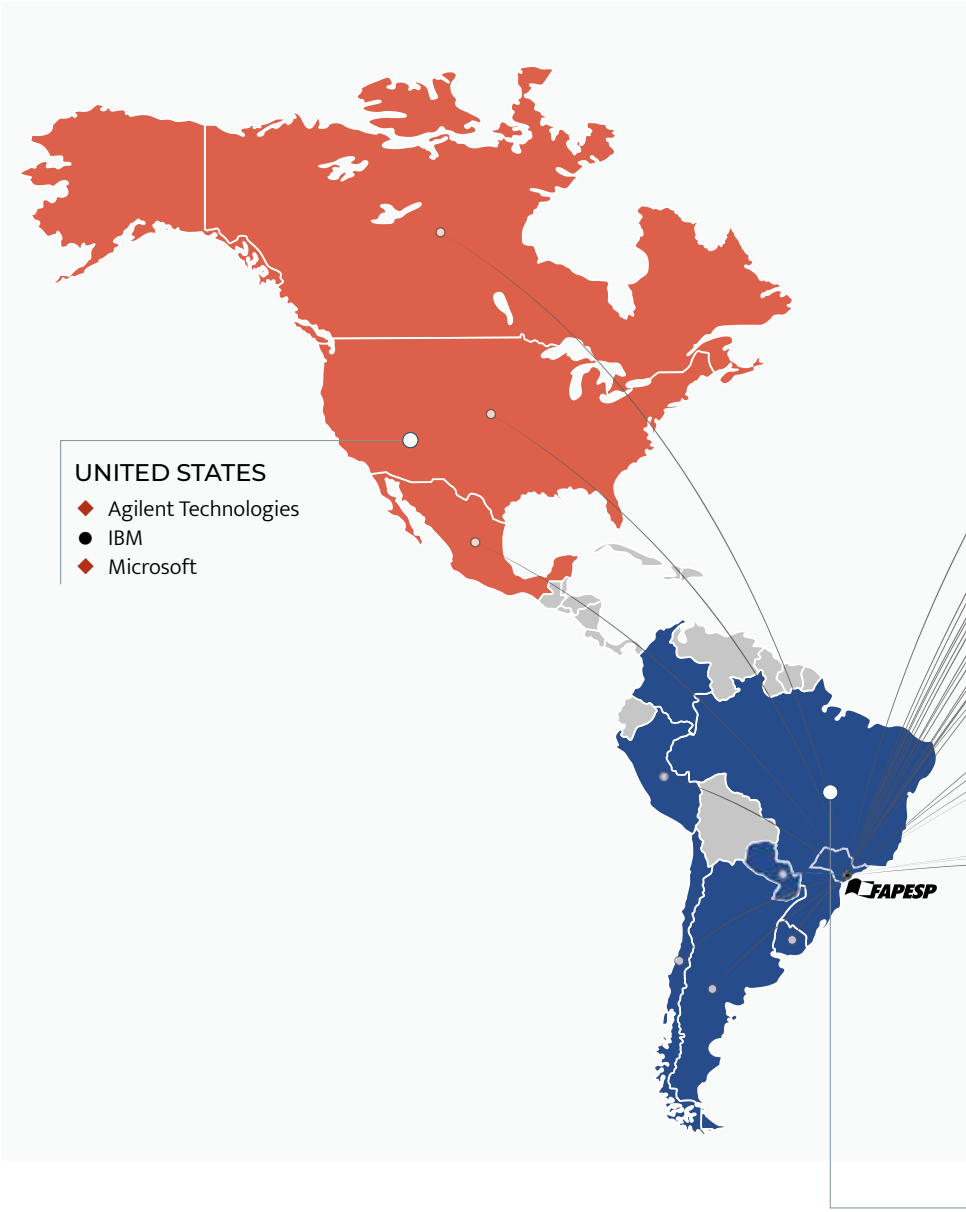
  – 6 foreign and 4 local;
  – 145 active projects and 134 newly contracted for in the year.

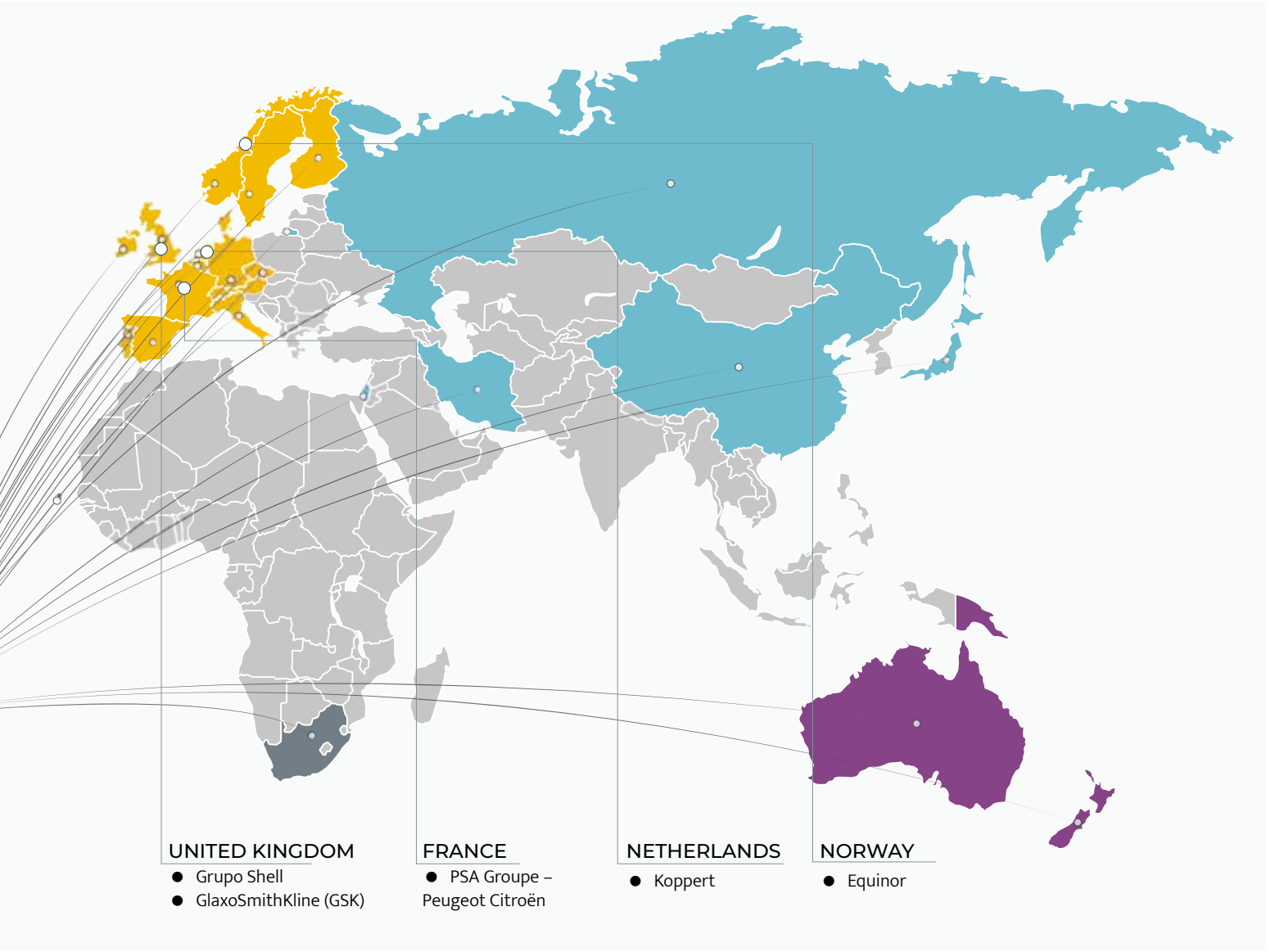
- 15 co-funders under the PITE Agreement:
  – 13 local and 2 foreign;
  – 53 active projects and 27 newly contracted for.

- 12 partner companies under the PITE Spontaneous Demand program:

  – 20 active projects and 3 newly contracted for.

* One of the ERC co-funders is not a company: Maria Cecilia Souto Vidigal Foundation.





UNITED KINGDOM
- Grupo Shell
- GlaxoSmithKline (GSK)

FRANCE
- PSA Groupe – Peugeot Citroën

NETHERLANDS
- Koppert

NORWAY
- Equinor

BRAZIL

- Andaraguá
- bioMérieux Brasil
- bp Brasil
- Braskem
- Cetesb
- Citrosuco
- Companhia Brasileira de Metalurgia e Mineração
- Copag
- Embraer/União Europeia 2020
- Embrapa
- Vale/Empresa Brasileira de Pesquisa e Inovação (Embrapii)
- EMS
- Energy Source
- Ericsson
- Biominas Brasil
- Grupo São Martinho
- IBM Brasil
- Infibra S.A.
- Intel
- Kryptus Segurança da Informação Ltda./MCTI/MCGI
- Laboratório BioVet S.A.
- Maiz Indústria e Comércio de Produtos Agropecuários Ltda.
- Medicines for Malaria Venture
- Natura*
- Sabesp
- Solvay
- Three unities in partner with USP-Lorena and with Unesp-São João da Boa Vista not appear.

* Natura: the cooperation agreement with Natura is due to run until 2023; the agreement governing the ERC established with Natura expired on July 31, 2021.

APPENDIX

- List of charts and tables in the report

List of tables and charts in the report

CHAPTER 1 THE INSTITUTION

CHAPTER 2 GENERAL INDICATORS

Disbursement, number of active projects and new projects contracted in 2022

Annual evolution of disbursement ($ PPP) – 2016 to 2022

Annual evolution of the number of projects contracted ($ PPP) – 2016 to 2022

Income and total disbursements of FAPESP in 2022

CHAPTER 3 FUNDING STRATEGIES

Trainning of Human Resources for Research

Basic and Applied Research

Research for Innovation

Research on Strategic Themes

List of tables and charts in the report

FAPESP 60 YEARS 1962 - 2022

EDITORIAL PRODUCTION

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