

ANNEX

BRAZILIAN Science, Technology and Innovation (STI) INSTITUTIONS RESEARCH ON COVID-19

INTRODUCTION

Several Brazilian STI institutions have launched contests and calls for research proposals on technological solutions aimed at fighting the COVID-19 virus and the difficulties arising from the social distancing required to face the pandemic.

This national effort has also engaged startups that already present solutions to mitigate some of the effects of the crisis and are contributing to traditional Brazilian research institutes that rely on accumulated experience in other to address this epidemiological crisis. Those initiatives - some of which are described below - started in the first spreading stage of the virus in Brazil and have the objective of providing different concrete solutions to reduce the impact of Covid-19 in Brazilian society and economy.

CONTESTS AND CALLS FOR RESEARCH PROPOSALS

MCTIC VIRUS NETWORK

The Ministry of Science, Technology, Innovations and Communications of Brazil (MCTIC) established an advisory committee and strategic plan to provide integrated and quick responses to emerging viruses. It coordinates the efforts of research laboratories with a view to identifying complementarities of infrastructure and activities in the ongoing research on covid-19, influenza and others. The objectives of the network are the integration of scientific research and development efforts in the area of emerging viruses; definition of research priorities; coordination of ongoing R,D&I initiatives related to emerging viruses; and development of technologies to assist the country in facing those challenges. Researchers and representatives of MCTIC, the Ministry of Health and development agencies participate in the initiative. The initiative already counts on the collaboration of institutions like the research facilities of Fiocruz, Butantan, CNPEM /LNBio and universities like USP, Unicamp, UFMG, UFC and UFRJ.

Within this network, the National Center for Research in Energy and Materials (CNPEM) is already employing tools like computational biology and AI to

evaluate the effectiveness of about 2 thousand existing drugs against Covid-19. Computational data tests use atomic structure data and the behavior of covid-19 proteins to examine the interaction of molecules of available medications with these target proteins, and to pre-select those that show promise in interfering with the infection. Selected molecules will then be tested in vitro to verify its effectiveness in eliminating the virus, which will allow the new use of already available medications.

The MCTIC also sent a provisional law proposal to the Presidency for the emergency release of R\$ 100 million (100 million Brazilian reais) from the National Scientific and Technological Development Fund (FNDCT), which awaits the approval of the Ministry of Economy to be applied in Research Networks, National Institutes of Science and Technology (INCT) and public calls via the Brazilian National Council for Scientific and Technological Development (CNPq) and the Funding for Studies and Projects (Finep).

FINEP-FAPESP: DEVELOPMENT OF TECHNOLOGIES FOR PRODUCTS, SERVICES AND PROCESSES TO FIGHT INFECTIOUS DISEASE BY THE CORONA VIRUS 2019 (COVID-19)

The São Paulo Research Foundation (FAPESP) and the Funding Authority for Studies and Projects (FINEP), under the PIPE / PAPPE Grant Program, launched a call for research projects on the development of technologies for products, services and processes to fight Covid-19. The research call will allow that participants from previous phases of the Grant program (Phase 1 or Phase 2) to commercialize emergency products or services.

FAPESP: SUPPLEMENTS FOR QUICK IMPLEMENTATION AGAINST COVID-19

The São Paulo Research Foundation (FAPESP) launched a call for research proposals on COVID-19 within the time limit of 24 months, with a view to understanding the virus` epidemiological characteristics, developing tests and therapies, conducting research on clinical procedures, identifying and evaluating innate immune responses and issues related to the social behavior of the affected population. The total amount of the research call is R\$ 10 million and the deadline for submission of proposals is June 22nd, 2020.

EMBRAPII-SEBRAE: TECHNOLOGICAL SOLUTIONS BY STARTUPS AND SMALL AND MEDIUM-SIZED ENTERPRISES

Brazilian Micro and Small Business Support Agency (SEBRAE) will assign R\$ 2 million to the development of technological solutions by startups and other small and medium-sized enterprises with a view to help the Brazil face Covid-19. The funds will add up to R\$ 4 million from the Brazilian Industrial Research and Innovation Company (EMBRAPII) and contributions by participating companies and accredited research and innovation centers. Joint resources are expected to reach the total of R\$ 10 million. The resources may be used for software development, system devices, hardware, medical parts and equipment, and others.

SENAI: MISSION AGAINST COVID-19

The National Service for Industrial Training (SENAI), through the "Innovation Call for Industry", will select projects that help prevent, diagnose and treat Covid-19. It foresees the destination of R\$ 10 million for proposals on solutions against problems caused by the virus, with immediate application and results within 40 days, in the areas of consulting, metrology, testing, analysis, research, development and innovation. Examples of these solutions are the manufacture of mechanical respirators and the development of rapid tests for the detection the disease.

CONFAP: EUROPEAN UNION EMERGENCY RESEARCH CALL FOR CORONAVIRUS DIAGNOSIS

The National Council of State Foundations of Research Support (CONFAP) released a proposal for Brazilian institutions to join the so-called "Development of therapy and diagnosis for fighting coronavirus infections" launched by `Innovative Medicines Initiative`, in cooperation with European Union and the European Federation of Pharmaceutical Industries and Associations (EFPIA). The research call has an emergency nature and the deadline for submission of proposals is this March 31st. Its objective is to identify new therapeutic agents, early diagnostic systems, and reliable data related to Covid-19. Brazilian partners can participate in a co-financing scheme. The European side plans to disburse EUR 45 million.

MPPE-SES / PE-PORTO DIGITAL: CHALLENGE COVID-19

The Covid Challenge 19 is an initiative by the Public Persecutor`s Office of the State of Pernambuco (MPPE), the State Health Secretariat of Pernambuco (SES-PE) and Porto Digital. The MPPE and SES-PE offer R\$ 1.3 million for innovative

and high-impact solutions that can be adopted in a short term, with a view to fighting the virus. The challenge already includes the submission of 543 ideas on 5 areas: a) monitoring the risk groups; b) information flow management; c) monitoring social isolation; d) support for health agents; and e) testing and diagnosis.

ARAUCÁRIA-SETI / PR-SESA / PR FOUNDATION: SUPPORT PROGRAM FOR THE PREVENTION, CARE AND FIGHT AGAINST THE PANDEMIC OF CORONAVIRUS

The program was launched by the Araucária Foundation for the Support of Scientific and Technological Development of the State of Parana, the General Superintendence of Science, Technology and Higher Education (SETI) of Parana and the State of Parana's Department of Health (SESA). This program aims to allocate R\$ 8 million for the development of projects aimed at prevention, care and fight against Covid-19 by higher education institutions in that state. The proposal submission deadline is March 23rd and the result is expected to be released on the following day.

USP

The University of São Paulo (USP) is conducting researches for vaccine development with a quick response against the virus. The work takes advantage of results from previous studies on other types of coronaviruses, which, hopefully, can help in the case of Covid-19. Brazilian research is comparatively safer, as it is based on the creation of a particle similar to coronavirus, the VLP (virus-like particle), equivalent to a hollow virus, without the genetic material and therefore without the transmissibility of the disease.

EMBRAER

EMBRAER has committed to contribute to the manufacturing of “control valves” and “flow sensors”, which will greatly increase the national manufacturers production capacity of respirators. The company also said it would work to adapt a model of respirator for use in the fight against COVID-19.

The company has partnered with Albert Einstein Hospital to provide technical support for the development of exhaust fans for biological control, using technology of high-efficiency air filters used in aircrafts, thus facilitating the

conversion of regular hospital units into intensive care facilities where COVID-19 patients can be treated.

PUBLIC CALL ABDI – SENAI - EMBRAPII

The “Brazilian Association of Industrial Development” (ABDI), together with the “Brazilian Enterprise of Research and Innovation” (EMBRAPII) and the “National Service of Industrial Apprenticeship” (SENAI), launched, on 26 March a second public call to receive proposals on innovations that could help against the problems caused by the COVID-19. The first phase of this project resulted in support grants for 6 projects that will receive up to BRL 10 million (approx. USD 2 million).

For this second phase, there are BRL 20 million allocated, to be invested in projects designed to prevent diagnose and treat the COVID-19, that are immediately usable and possible to be produced in under 40 days. The answers to the call could be related to issues such as: increasing the numbers of ventilators available; development of tests for the identification of the virus or of personal protective equipment that could replace masks, gloves and soaps; replacement of parts and components used in intensive care units (ICUs); among other related projects. The total amount destined to each project could be of up to USD 2 million.

A project presented by “Aredes Hospital Equipment” is among those selected in the first call for proposals. It will adapt veterinary mechanical respirators for human use. The new equipment will be designed, manufactured and tested in the SENAI network. The expectation is that, once the device is approved by the National Regulatory Authority (ANVISA), it will reach a monthly production of one thousand units.

Another company selected was “Novitech Medical Equipment”. It proposed to expand the supply chain of components used by pulmonary respirator manufacturers, through the identification of possible bottlenecks, and potential new suppliers and through the assessment of alternatives options to manufacture the parts.

A project for the production of quick-tests for the Covid-19 was presented by the company Hi Technologies (Hilab) was also selected. It expects to deliver up to 15 thousand tests in seven days; 150 thousand in 40 days; and 450,000 tests in three months.

The company “MDI Indústria e Comércio de Equipamentos Médicos”, in partnership with the SENAI Innovation Institute for Advanced Health Systems (located in the state of Bahia), was another selected project. It will develop a "golden standard" diagnosis test as recommended by WHO to promptly identify the COVID-19 through fluids samples acquired from the oral or nasal mucous membrane. The estimate is to produce up to 4.800 monthly tests.

FEDERAL UNIVERSITY OF RIO DE JANEIRO (UFRJ, IN ITS PORTUGUESE INITIALS)

A team of researchers at the University will begin, on 6 April, testing a cheaper mechanic lung ventilator, produced with widely available materials in Brazil.

CARLOS CHAGAS FILHO FOUNDATION FOR THE FOSTERING OF RESEARCH IN RIO DE JANEIRO (FAPERJ, IN ITS PORTUGUESE INITIALS)

FAPERJ has issued an emergency call for COVID-19 related researches up to the cap of BRL 30 million (approx. USD 6 million). Locally based (Rio de Janeiro) SMEs and startups are allowed to participate. The projects could have a broad range of focus, such as the genetics of the virus, its pathology, clinical aspects, diagnosis, epidemiology, interaction virus-host, development of tests, therapy and control, innovative solutions to increase the availability of products related to the fight against the virus, among others.

The resources made available through the grants could be used for the construction or improvement of facilities or to finance expenses related to the research.

JOINT VENTURE “BRAZILIAN ENTERPRISE OF RESEARCH AND INNOVATION - EMBRAPII” – “ELDORADO INSTITUTE” – “BRAILE COMPANY”

EMBRAPII approved a grant of BRL 2.3 million (approximately USD 450 thousand) for the development of a device (Extracorporeal Membrane Oxygenation – ECMO), in partnership with the Eldorado Institute (one of the units comprising the EMBRAPII system) and the Braille Company. This ECMO oxygenates and removes carbon dioxide from the bloodstream, in a machine outside the human body (such as in hemodialysis). Although this equipment already exists outside Brazil, the technology supported domestically is more efficient, allowing for the improvement of medical interventions at lower costs. The manufacturing of

the device will be 100% national. The technology should be ready in eight weeks and, after that, an initial batch of 100 units of the device will be produced and distributed to 21 facilities already capable to perform extracorporeal oxygenation.

Besides aiding the treatment against acute respiratory failure, one of the main outcomes of COVID-19 severe cases, the use of the equipment is also advised for adults or children in several other conditions, such as cases of heart transplantation, myocardial infarction and cardiac arrest. EMBRAPII will bear 50% of the costs of the projects designed to combat COVID-19 infections.

NATIONAL LABORATORY FOR SCIENTIFIC COMPUTING (LNCC, IN ITS PORTUGUESE INITIALS)

On 25 March, the LNCC announced that it had identified and sequenced 19 different genomes of the COVID-19, from samples coming from different regions of Brazil, in under 48 hours. The effort was made possible thanks to the supercomputer “Santos Dumont”. This initiative had the participation of several universities in Brazil, the Oxford University, and other national research institutions.

The identification of different virus strains through genetic sequencing is fundamental to identify possible viral mutations, the transmission chains and the origin of the virus found in a specific region. The study carried out at LNCC could confirm, for instance, that most samples descend from viruses originating in Europe, while a smaller sample arrived in Brazil directly from China.

TECHNOLOGICAL SOLUTIONS AND BRAZILIAN STARTUPS INITIATIVES

STARTUPXCVID

The Governance & New Economy Community (Gonew.co), with the support from the Brazilian Association of Startups (Abstartups), launched the campaign StartupsxCovid19, which seeks to map companies with innovative solutions to face the coronavirus crisis. Among other initiatives, mapping will be used to provide information to entities such as the Ministry of Health.

TECHNOLOGY ASSOCIATION OF SANTA CATARINA (ACATE, IN ITS PORTUGUESE INITIALS)

ACATE is leading an effort comprised of several startups such as “CogniSigns”, “Anestech” and “Hefesto” to design and produce 3D-printed respirators. The open source prototypes will allow that other innovation hubs equipped with 3D printers to also “print” the products, increasing the number and diversifying manufacturers across the country. The initiative is supported by the Albert Einstein Hospital, from São Paulo, through its innovation hub, the “Eretz.bio”.

HI TECHNOLOGIES

The startup Hi Technologies, based in Curitiba, State of Parana, announced the development of a rapid test for Covid-19 detection that provides results in 10 minutes. The large-scale production of the test kit is underway, with delivery of kits in April. The startup is known for the Hilab device, which integrates internet of things (IoT) and artificial intelligence to perform remote exams by collecting drops of blood in the Hilab (available in pharmacies), that transmits information to the laboratory responsible for analyzing the result, issuing and signing the respective report. Hilab is already capable of testing for HIV, dengue, zika and hepatitis, in addition to measuring cholesterol levels, blood glucose and other issues.

Company's contact details: Hi Technologies 6.400B, Rua Eduardo Sprada, Cidade Industrial, Curitiba, Parana. <https://hitechnologies.com.br/site/> contact @ hitechnologies +55 41 3022-3461 CEO - Marcus Figueredo

ROCKET CHAT

The startup Rocket Chat (a participant of the Startout Brasil Program) is a platform for the organization of hackathons based in Brazil and in the United States. The company is organizing hackathons to seek innovation and collaborations ideas to fight COVID-19. The marathon will include participants from 20 Brazilian cities. Considering the emergency of the situation, registration was closed on March 23rd. The link to the hackathon is: <https://covid19.rocket.chat>.

Contact details: Rocket Chat Rua Dr Jorge Fayet, 757, Porto Alegre, Rio Grande do Sul, Brazil <https://rocket.chat/>

TRUCKPAD

Another participant in the Startout Brasil Program, the startup Truckpad operates in the area of logistics and is one of the largest digital cargo and truck drivers connection platforms in Latin America. Truckpad will offer free and voluntary transportation to goods donated to hospitals and medical assistance initiatives in Brazil. Those interested in making donations must access the website www.transportevoluntario.com.br.

Contact details: Truckpad <https://www.truckpad.com.br/> CEO Carlos Mira

“IN LOCO” STARTUP

The “In Loco” startup is specializing in solutions for smartphone-based geolocation and has adapted its technology to monitor social isolation, including the generation of disaggregated isolation reports by specific neighborhoods, so that public authorities can create targeted educational campaigns and tailor-made inspection routines.

The technology developed can also monitor the growth of local hospital capacity and improve the allocation of health workers.

The startup makes sure that the data are general, collective and respect people`s privacy. The municipality of Recife has already adopted the tool.

SAVELIVEZ

This startup, a participant in the “Startout” Brasil program, developed the virtual assistant Livia.bot, aimed at clarifying doubts about Covid-19 symptoms and providing information about blood donation throughout Brazil.

NOKNOX

This startup has created an app called “Vizinho do Bem” (“Nice Neighbor”, free translation), which creates a support networks among neighbors to support at risk individuals.

ILHASOFT

This startup developed, in partnership with Unicef, a software called “HealthBuddy” that imitates the human voice to combat fakenews.

AYA TECH

Through nanotechnology, the startup created a disinfectant called Gy, which has the potential to substitute sanitizers and is capable of eliminating COVID-19 among other communicable diseases.

Geneva, 31 March 2020
