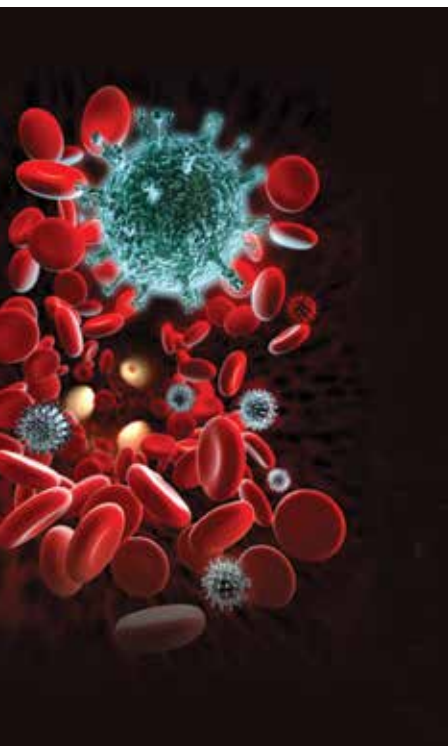


RESEARCH, INNOVATION AND DISSEMINATION CENTERS (RIDC)

CUTTING EDGE RESEARCH

Long-term funding (10+years)
for multi-institutional research centers of
excellence, in all areas of knowledge

RESEARCH, INNOVATION AND DISSEMINATION CENTERS (RIDC)



The São Paulo Research Foundation (FAPESP) funds 25 Research, Innovation and Dissemination Centers (RIDCs) for up to eleven years, subject to favorable reviews in years 2, 4 and 7.

Established by FAPESP in 1998, the RIDC Program funds research projects that address transformative questions regarding current knowledge and whose results can have positive impacts on society. RIDCs are expected to conduct ambitious and excellent research on relevant themes in their respective knowledge areas. The program strives to gather scientists around questions of basic research or application-oriented projects, to enable them to form world-class research centers. In addition, each RIDC must actively develop opportunities whereby to research results show commercially and/or socially relevant high-impact applications, as well as contributing to education and dissemination of knowledge.

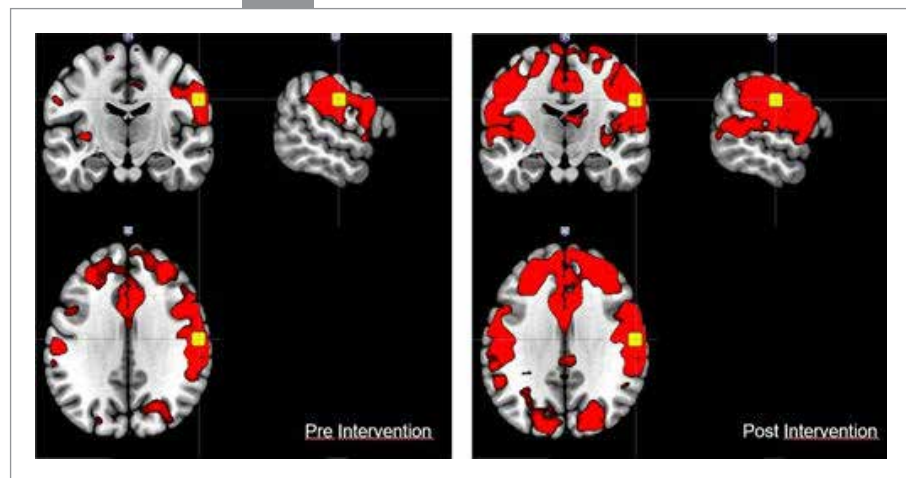
The first call for RIDCs in 2000 led to the creation of 11 centers in all knowledge areas. The current 17 RIDCs were approved in the second call and have been operating since 2013. In 2021, FAPESP began organizing annual calls for proposals in the following areas: health, biological, agricultural and veterinary sciences (in 2021); human and social sciences, architecture and urbanism, economics and administration (in 2022); and exact sciences, earth sciences and engineering (in 2023). In the 2021 and 2022 calls, eight new centers were approved.

RIDCs RESEARCH AREAS

- ▷ Food and nutrition
- ▷ Glasses and glass-ceramics
- ▷ Functional materials
- ▷ Neuroscience and neurotechnology
- ▷ Inflammatory diseases
- ▷ Biodiversity and drug discovery
- ▷ Toxins, immune-response, and cell signaling
- ▷ Neuromathematics
- ▷ Mathematical sciences applied to industry
- ▷ Obesity and associated diseases
- ▷ Cell therapy
- ▷ Metropolitan studies
- ▷ Human genome and stem-cells
- ▷ Computational engineering
- ▷ Redox processes in biomedicine
- ▷ Violence
- ▷ Optics, photonics, and atomic and molecular physics
- ▷ Antimicrobial Resistance
- ▷ Carbon Research in Tropical Agriculture
- ▷ Theranostics Innovation
- ▷ Biodiversity and Climate Change
- ▷ Biology of Bacteria
- ▷ Studies on Slums
- ▷ Ecosystem Management
- ▷ Governance of Environmental Changes

BRAINN studies epilepsy and strokes, and the injury mechanisms that follow disease onset and progression. This research has important applications for prevention, diagnosis, treatment, and rehabilitation, and will serve as a model for better understanding of normal and abnormal brain function. The driving force comes from the need to approach these complex biological problems by combining the expertise of research groups with distinct and complementary backgrounds.

The Center's research seeks to be clinically important, realistic and highly original, combining genetics, neurobiology, pharmacology, neuroimaging, computer sciences, robotics, physics, and engineering. It will benefit patients suffering from epilepsy, stroke, and other prevalent diseases and will substantially contribute to ongoing scientific discussions within the areas of neurology, psychiatry, and cognitive neuroscience.



A study performed by BRAINN supported by FAPESP resulted in the development of a novel rehabilitation device. The article was recognized as outstanding by the 20th International Conference on Computational Science and its Applications (fMRI scans of a stroke patient before and after rehabilitation using non-immersive virtual reality software (credit: Raphael Casseb/UNICAMP).

BRAINN

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FAPESP Process 2013/07559-3
Operation period: 2013-2024

 www.brainn.org.br

**ASSOCIATED
INSTITUTIONS**

Renato Archer Center for Information Technology (CTI)
Centre National de la Recherche Scientifique (CNRS), France
Federal University of ABC (UFABC)
Federal University of São Paulo (UNIFESP)
Phillips University, Germany
São Paulo State University (UNESP)
University College London (UCL), United Kingdom
University of Erlangen, Germany
Université de Montréal, Canada

**RESEARCH
HIGHLIGHTS**

[COVID-19 sequelae are the highlights of a neuroscience conference at the State University of Campinas](#)

Brazilian researchers analyzed data from MRI scans and various tests to detect biological alterations linked to the neurological symptoms most reported by patients, especially anxiety, depression, sleepiness and fatigue. The latest results were presented to the ninth edition of BRAINN Congress.

[Novel technique distinguishes between types of oral bone lesion based on MRI scan image texture](#)

First study to identify pixel and voxel organizational parameters in MRI scans of two different (albeit similar) benign tumors may contribute to development of more accurate, less invasive diagnosis.

[A model that mimics malformation associated with severe epilepsy paves way to novel therapies](#)

Scientists at a FAPESP-funded research center reprogrammed skin cells from patients with epilepsy to differentiate into cortical organoids with hallmarks of the malformation known as focal cortical dysplasia.



BV-FAPESP
**Research projects
supported in the BRAINN**



BRAINN in the Media
News about the Center

CTC research focuses on understanding the biology of stem cells, as well as in developing new technology for their use in the treatment of diseases.

The researchers at CTC were responsible for the generation of the first embryonic stem cell line in Brazil and produced some of the first bovine and ovine clones in the country. In the laboratory, CTC researchers are interested in the signaling pathways of mammalian and human embryonic stem cell, in animal and human adult cells reprogramming to the embryonic state of pluripotency (iPS cells) and in the functioning of adult stem cells, such as hematopoietic, mesenchymal and cancer.

Using stem cells derived from healthy people, CTC scientists investigate ways of producing blood components as an alternative source of blood transfusion. In the laboratory, they use iPS cells derived from patients with blood disorders to better understand how these diseases occur and how they could be prevented or more effectively treated.

In the clinical area, researcher-physicians develop new methods of diagnosis and new treatments for leukemia, and also use new stem cells, such as mesenchymal stem cells, for the treatment of many diseases, such as diabetes mellitus, systemic sclerosis and aplastic anemia. CTC relies upon cellular and molecular biology



Patient with advanced refractory lymphoma was treated by researchers from the CTC, funded by FAPESP. The technique known as CAR T-cell therapy was used for first time ever in Latin America (photo: FMRP-USP).

laboratories and cell culture and inpatient units involved in hematopoietic stem cell transplantation in Ribeirão Preto, Pirassununga and São Paulo.

For 15 years, the group has been conducting research on production factor FVIII and FIX coagulation using human cells. Excellent results obtained in the period have resulted in two patents for FVIII, one for FIX, and one for FVII.

In the past few years, the research has led to the development of a platform for expanding genetically modified T cells for treat patients with leukemia and lymphomas; advances in the treatment of systemic and multiple sclerosis; new perspectives on fighting astrocytoma, one of the most aggressive types of brain tumor; inhibition of melanoma cells in culture; studies on telomeres; and the formation of a cell bank with the genetics of the Brazilian population.

CTC

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Fundação Hemocentro de Ribeirão Preto

FAPESP Process 2013/08135-2

Operation period:
2001-2013 / 2013-2024



**ASSOCIATED
INSTITUTIONS**

Federal University of São Carlos (UFSCAR)
Hemotherapy Center of Ribeirão Preto (FUNDHERP)
King's College, United Kingdom
Leiden University, Netherlands
Northwestern University, USA
Paris University, France
São Paulo State University (UNESP)
University of California, USA
University of Feinberg, USA
University of Guelph, Canada
University of Montreal, Canada
University of Munich, Germany
University of Oxford, United Kingdom
University of Southern California, USA

**RESEARCH
HIGHLIGHTS**

[Brazilian model vaccination program reduced severe cases of COVID-19 and deaths even from variants](#)

The dynamics of SARS-CoV-2 variant substitution in the town where a clinical trial of vaccination effectiveness was conducted matched the pattern seen elsewhere in the country, but most cases were mild. The researchers analyzed 4,375 whole genomes of the virus.

[Cancer: FAPESP-supported center extends mastery of technique involving genetically modified defense cells](#)

Research that can increase Brazil's access to CAR T-cell therapy, an increasingly important strategy for treating cancer, is under way at the University of São Paulo's Center for Cell-Based Therapy (CTC) in Ribeirão Preto, and Butantan Institute.

[Study details benefits of stem cell transplants for systemic sclerosis patients](#)

Patients submitted to a procedure that "resets" the immune system were tracked for a year by scientists at a FAPESP-supported research center. Their clinical improvement correlated with renewal of a group of defense cells known as B lymphocytes.



BV-FAPESP
**Research projects
supported in the CTC**



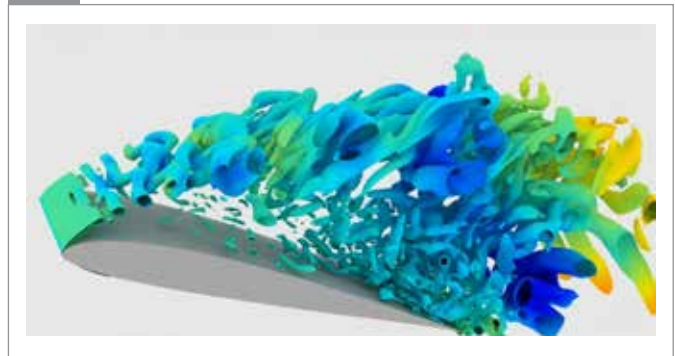
CTC in the Media
News about the Center

CCES is a world-class multidisciplinary research center dedicated to advanced computational modeling in physical and chemical molecular sciences, computational mechanical engineering and materials, computational biology and bioinformatics, computational geophysics, and computer science. It provides a stimulating scientific environment for students and post-doctoral fellows interested in high-performance computer simulations, computational modeling, and data-intensive computing to solve frontier problems in molecular sciences and engineering.

The Center promotes integration among computational scientists with different kinds of expertise, enabling them to conduct high-level research in new ways, by exploiting complementary knowledge and research practices. In consonance with the emerging field of eScience, broad impacts are expected on ways to cope with advanced techniques in parallelism extraction and multi-core architectures, as well as processing, curation, and provenance of large volumes of information and data.

RESEARCH
AREAS

- ▷ Bioinformatics and Computational Biology
- ▷ Computational Geophysics
- ▷ Computational Mechanical Engineering
- ▷ Computational Quantum Chemistry
- ▷ Data Cyberstructure
- ▷ High Performance and Data-Intensive Computing
- ▷ Quantum and Classical Molecular Simulations in Applied Physics
- ▷ Quantum and Classical Molecular Simulations in Biophysical Chemistry



Brazilian researchers from CCES studied the morphology of owl wings in search of characteristics that enable these birds to fly silently (image: UNICAMP).

CCES

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FAPESP Process 2013/08293-7
Operation period: 2013-2024

 cces.unicamp.br

**ASSOCIATED
INSTITUTIONS**

Biocelere Agroindustrial
Graz University, Austria
Texas University, USA
University of Buenos Aires, Argentina
Yale University, USA

**RESEARCH
HIGHLIGHTS**

[Exotic water ice contributes to understanding of magnetic anomalies on Neptune and Uranus](#)

A study conducted at the State University of Campinas integrated knowledge in several fields with high-performance computing to investigate the properties of water inferred to exist in large quantities deep inside the ice giants.

[Owl wings inspire aerospace industry to design quieter aircraft](#)

Brazilian researchers studied the morphology of owl wings in search of characteristics that enable these birds to fly silently.

[Software locates sugarcane genes of interest](#)

Brazilian researchers develop a program for high-performance computers to map specific portions of plant DNA faster and less expensively for use in breeding more productive and stress-resistant varieties.



BV-FAPESP

**Research projects
supported in the CCES**



CCES in the Media

News about the Center

CEM, at the University of São Paulo (USP) and the Brazilian Center for Analysis and Planning (CEBRAP), is made up of a multidisciplinary group of scholars that includes political scientists, sociologists, geographers, economists, demographers, engineers and anthropologists.

Since it was established in 2000, CEM has produced internationally leading research in the social sciences on themes related to social, economic, and political change in contemporary cities, with emphasis on the Brazilian case. The studies seek to contribute to national and international debates about social and spatial inequalities and compare urban and metropolitan contexts in different regions of Brazil and in other countries.

CEM's mission is to promote the production and development of knowledge in the field; disseminate this knowledge to society; develop new technologies, data, indicators, or methodologies that support policymakers; and develop the skills and knowledge of its researchers and collaborators.



CEM develops advanced studies on the role of public policies on individuals' well-being (photo: Léo Ramos Chaves).



Map with RMSP passenger terminals

RESEARCH AREAS

- ▷ Councils, Subnational Regimes and Capacity Building
- ▷ State-level variation in fundamental (6-14) education policy
- ▷ The Multilevel governance of social assistance policy
- ▷ Health policy – comparing experiences in the State of São Paulo
- ▷ Comparing Subnational Public Policies and their changes in Brazil
- ▷ Formal and informal institutions in education policy
- ▷ Evaluation of USP's Affirmative Action policy
- ▷ Street-level bureaucracy and interaction with users in social policies
- ▷ Citizens' preferences and inequality
- ▷ Budget governance in large metropolises
- ▷ Governance in large metropolises in comparative perspective
- ▷ Urban transportation socio-spatial inequalities

CEM

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FAPESP Process 2013/07616-2
Operation period:
2001-2013 / 2013-2024

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Polytechnic School, University of São Paulo (Poli-USP)
School of Arts, Sciences and Humanities, University of São Paulo (EACH)
Brazilian Center for Analysis and Planning (CEBRAP)
Institute of Education and Research (INSPER)
Getulio Vargas Foundation (FGV)

**RESEARCH
HIGHLIGHTS**

[Community health workers could play a key part in combating the pandemic in Brazil, researcher says](#)

An article in The Lancet stresses the vulnerability of these health workers, whose readiness to counter fake news with trustworthy information, and to monitor COVID-19 patients in home isolation, has been neglected.

[Vulnerability of Brazilian workers evaluated in crisis caused by the COVID-19 pandemic](#)

Only 13.8% of the workforce have jobs in sectors not hard hit by social isolation according to a research network set up to propose ways of improving the quality of government policies for dealing with the crisis.

[Housing deficit makes “vertical isolation” impossible, Brazilian researchers say](#)

Research by the FAPESP-funded Center for Metropolitan Studies (CEM) shows that it is not feasible to separate high-risk groups in low-income communities, where the majority of the Brazilian population live. The problem is especially acute in the Southeast region, with metropolitan São Paulo displaying the largest deficit.



BV-FAPESP
**Research projects
supported in the CEM**



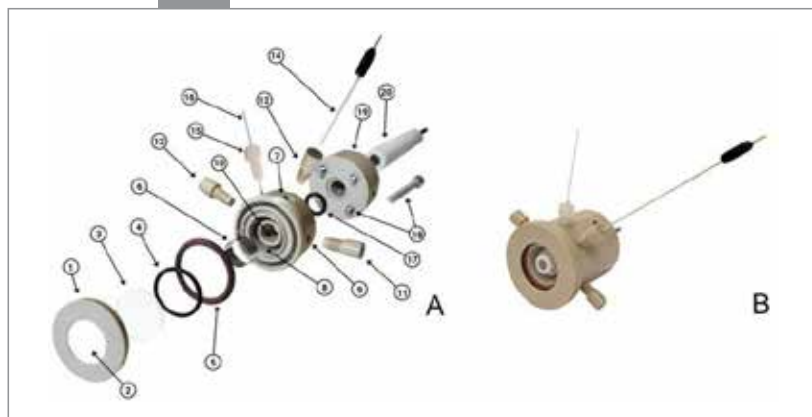
CEM in the Media
News about the Center



RESEARCH DISSEMINATION
**[centrodametropole.fflch.usp.br/en/
difusao-cientifica](http://centrodametropole.fflch.usp.br/en/difusao-cientifica)**

The core focus of CDMF is the ability to synthesize materials with a controlled chemical composition, crystallographic structure and morphology as well as to combine theory, simulations and experimental results. Its researchers use these skills for the development of functional and nanostructured materials to address new societal needs by finding solutions in three main fields: renewable energy, health, and the environmental sustainability.

Innovations and technological transfer are directly connected to the basic research program (i.e., with functional nanostructured materials) in the following segments: 1) pilot plants for functional nanoparticles; 2) development of new applications for functional materials, and 3) generation of spin-off companies.



Schematic of novel cell: (1) threaded lip; (2) aperture for passing radiation beam; (3) window; (4, 5, 17) O-ring; (6, 16) counterelectrode; (7) cell body part 1; (8) chamber for electrolyte, counterelectrode and reference electrode; (9, 11, 13) electrolyte inlet-outlet; (10) work electrode inlet; (12) reference electrode inlet; (14) reference electrode; (15) counterelectrode inlet; (18) bolt; (19) cell body part 2; (20) work electrode (image: researcher's archive).

RESEARCH
AREAS

- ▷ Renewable energy
- ▷ Environmental sustainability
- ▷ Health
- ▷ Theoretical

CDMF

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FAPESP Process 2013/07296-2

Operation period:
2001-2013
2013-2024

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Federal University of São Carlos (UFSCAR)
Federal University of São Paulo (UNIFESP)
Information Technology Education and Training Foundation (FACTI)
University of São Paulo (USP)

**RESEARCH
HIGHLIGHTS**

Researchers explore strategies to convert CO₂ into value-added products for industry

One of the goals of the study conducted by scientists at the Center for Development of Functional Materials and the Center for Innovation in New Energies is to reduce atmospheric emissions of this greenhouse gas.

Novel material can be used to oxidize water molecules and produce hydrogen

Thin films of transition metal tungstate showed potential for use in water splitting reactions and other photoelectrocatalytic applications.

Nanomaterial degrades organic pollutants when activated by light

The novel material was synthesized at the Center for Development of Functional Materials. The aim of the study was to combat the contamination caused by inappropriate disposal of pesticides and pharmaceuticals.



BV-FAPESP
**Research projects
supported in the CDMF**



CDMF in the Media
News about the Center



RESEARCH DISSEMINATION
cdmf.org.br
www.labi.ufscar.br

The major goals of this Center are to conduct basic and applied science, while developing technology in all areas of biodiversity and drug discovery through research in state-of-the-art of natural product chemistry, synthetic organic chemistry, molecular and structural biology, biochemist, medicinal chemistry, drug design and pharmacological assays.

Its specific objectives include bioprospecting Brazilian flora to identify components with a broad spectrum of biological activities (e.g., antiparasitic, antibacterial, anticancer); selection of promising bioactive compounds for organic synthesis and studies of the relations between the structure and activity (SAR, QSAR); drug design based on the structure of the receiver (SBDD) and the binder (LBDD); optimizing of lead compounds; and *in vitro* and *in vivo* preclinical studies of efficacy, toxicology and pharmacokinetics for evaluation of candidate drugs and optimization of their properties.

The ultimate goal is the development of new chemical entities (NCEs) with potential for innovation in clinical development. To this end, CIBFar is organized to integrate modern approaches in biodiversity and drug discovery.

Its main characteristic include a well-established infrastructure in terms of technical and financial competencies, technological education and executive management. Integration with the productive sector is maximized to identify opportunities and set goals.



Synthetic compounds and molecules derived from natural products belonging to Brazil's biodiversity are being screened by teams at the Center for Innovation in Biodiversity and Drug Discovery, which is supported by FAPESP (photo: Daniel Antonio / Agência FAPESP).

CIBFar

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FAPESP Process 2013/07600-3

Operation period:
2001-2013 / 2013-2024

 cibfar.ifsc.usp.br

ASSOCIATED
INSTITUTIONS

Medicinal and Computational Chemistry Laboratory (LQMC) and Molecular Biophysics Laboratory, São Carlos Institute of Physics at the University of São Paulo (IFSC-USP)

Center for Bioassays, Biosynthesis and Ecophysiology of Natural Products (NUBBE), Institute of Chemistry, São Paulo State University (IQ-UNESP)

Organic Synthesis Laboratory, Institute of Chemistry, State University of Campinas (IQ-UNICAMP)

Natural Product and Organic Synthesis Laboratory, Department of Chemistry, Federal University of São Carlos (DQ-UFSCar)

Natural Products Laboratory, Ribeirão Preto School of Pharmaceutical Sciences, University of São Paulo (FCFRP-USP)

RESEARCH
HIGHLIGHTS

[Researchers find compound that combats multidrug resistant bacteria in less than one hour](#)

In vitro experiments were conducted at a FAPESP-supported research center on synthetic peptide inspired by molecules secreted by the probiotic bacterium *Lactobacillus plantarum*.

[Researchers seek antiviral molecules for the treatment of COVID-19](#)

Synthetic compounds and molecules derived from natural products belonging to Brazil's biodiversity are being screened by teams at the Center for Innovation in Biodiversity and Drug Discovery, which is supported by FAPESP.

[Consortium vows to find new drugs against Chagas disease, leishmaniosis and malaria](#)

Initiative supported by FAPESP, USP, UNICAMP and global partners sets out to discover new molecules against tropical parasitic diseases. Its aim is to develop effective and affordable drugs.



BV-FAPESP

**Research projects
supported in the CIBFar**



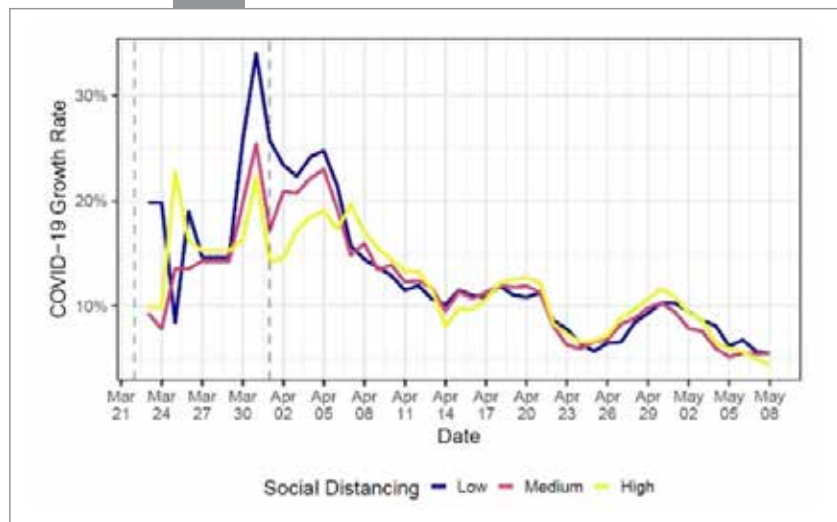
CIBFar in the Media

News about the Center

CeMEAI provides resources and mechanisms to connect scientists, engineers, mathematicians and computer specialists in pursuit of solutions to challenging industrial problems, applying techniques from mathematical sciences in a collaborative environment, training high-level human resources, developing new transformative mathematical techniques and exploring their applications for the benefit of society.

It disseminates information on applications of mathematical sciences, identifies areas that can benefit from new research in mathematical sciences, and promotes contact among specialists in mathematical sciences and entrepreneurs, innovation agents, industry workers, researchers and practitioners from other areas of knowledge to discuss common problems.

It aims to help build a more solid and lasting multidisciplinary community, training students so that they can collaborate in solving practical problems and propagate its philosophy to other regions of the country. It also promotes the multidisciplinary education of mathematicians and statisticians from the beginning of their careers, contributing to the formation of a community more open to dialogue with other areas of knowledge, and to the use of mathematics and statistics in a wider range of applications.



The first vertical dotted line marks the introduction of São Paulo's stay-at-home order. The second marks the federal government's recommendation to wear face coverings. The left-hand axis represents average weekly growth in the number of confirmed cases of COVID-19 in cities across the state of São Paulo (image: CeMEAI).

CeMEAI

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FAPESP Process 2013/07375-0
Operation period: 2013-2024

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ASSOCIATED INSTITUTIONS

Federal University of São Carlos (UFSCAR)
 State University of Campinas (UNICAMP)
 São Paulo State University (UNESP)
 Institute of Aeronautics and Space (IAE)

RESEARCH HIGHLIGHTS

[Computational algorithm associated with electroencephalography proves effective to diagnose Alzheimer’s](#)

Using two low-cost techniques, researchers in Brazil differentiate patients with the disease from healthy subjects. Next steps include refining the approach to diagnose the disease in its early stages.

[Social isolation and face covering reduced SARS-CoV-2 spread by 15% in Brazil’s 1st epicenter of COVID-19](#)

The reduction resulting from implementation of these measures in São Paulo was been calculated for the period between mid-March and early May 2020 using a mathematical model developed by a FAPESP-funded research center. The scientists also estimated that these two public health measures reduced the peak of transmission by 25% in Brasília.

[Study shows advantage of alternating quarantines in cities across the state of São Paulo](#)

Strategy would maintain economic activity and protect healthcare services, according to system developed by a research center supported by FAPESP.



BV-FAPESP
Research projects supported in the CeMEAI



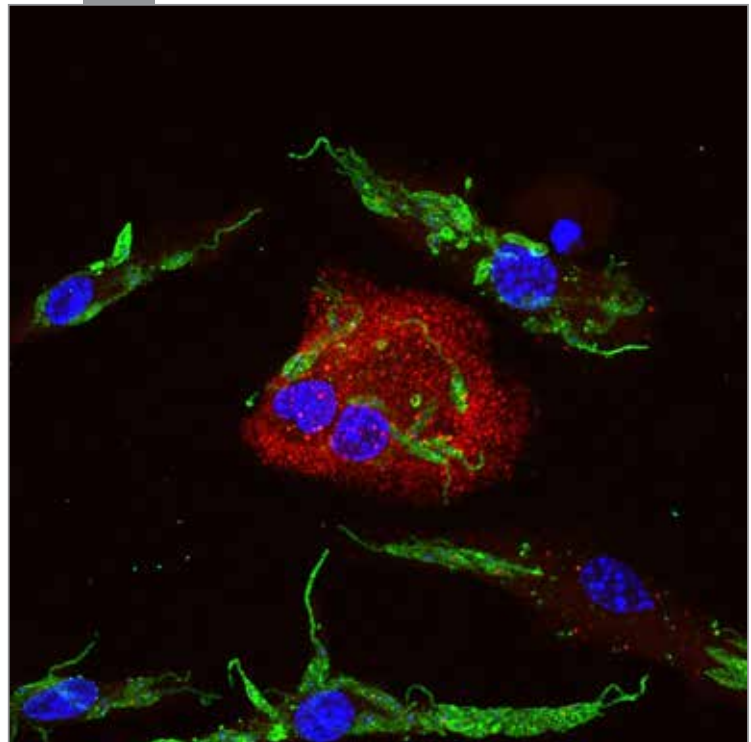
CeMEAI in the Media
News about the Center



RESEARCH DISSEMINATION
cemeai.icmc.usp.br/educacao-e-difusao

The Center for Research in Inflammatory Diseases (CRID) was created with the aim of producing integrative and translational scientific research to identify and validate new biological pathways involved in the induction and resolution of inflammation. It relies on the experience of researchers from various fields of Biomedical Sciences linked to basic (genetics, molecular and cellular biology, immunology, pharmacology and pathology) and clinical research (rheumatology, immunology, infectology and dermatology), in addition to those from area of bioinformatics.

The specific objective of the Center is to advance knowledge about inflammatory diseases (infectious, autoimmune and related to the cardiovascular system) to recognize and understand the molecular, immunological, pathological and pharmacological mechanisms involved; identify new biological targets for the development of pharmacological therapeutic tools; research possible diagnostic markers and prognostic indications; and apply new knowledge to the design and synthesis of molecules for the treatment of inflammatory diseases.



Immunofluorescence image showing macrophages (blue) infected with Leishmania amazonensis (green) and gasdermin-D (red) expressed by macrophages (image: Keyla Sá/FMRP-USP).

ASSOCIATED
INSTITUTION

Oswaldo Cruz Foundation (FIOCRUZ)

CRID

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FAPESP Process 2013/08216-2
Operation period: 2013-2024

 crid.fmrp.usp.br

RESEARCH
HIGHLIGHTS

[Compound reduced inflammation in COVID-19-infected mice without compromising immune response to virus](#)

A team affiliated with a FAPESP-supported research center showed in mice that molecules capable of preventing the peptide C5a from binding to its cellular receptor helped prevent lung damage and other complications typical of severe COVID-19.

[Study identifies intracellular protein that can block inflammation in autoimmune diseases](#)

The discovery, led by researchers at a FAPESP-supported center, could lead to novel treatments for autoimmune diseases.

[Study reveals mechanism involved in neuropathic pain and could help develop specific treatment](#)

Neuropathic pain is chronic and caused by injury to the nervous system, affecting between 3% and 15% of the population. The only treatment options currently available are drugs originally developed for other conditions, such as epilepsy or depression.



BV-FAPESP

**Research projects
supported in the CRID**



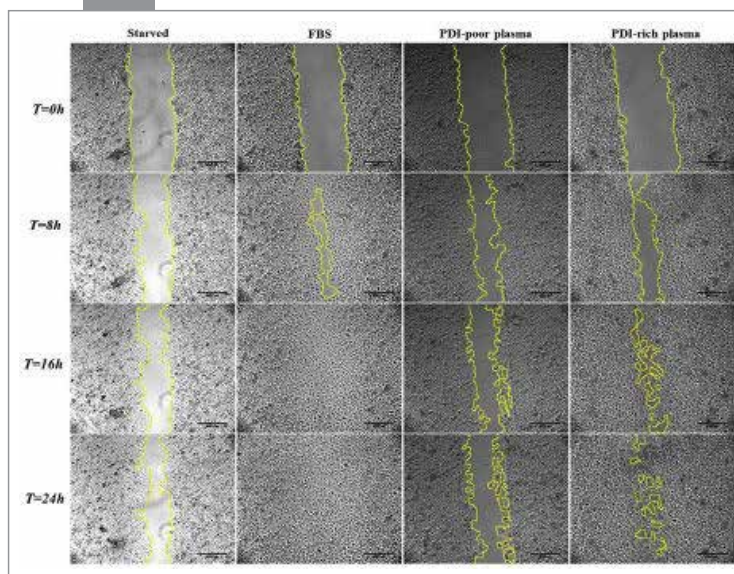
CRID in the Media

News about the Center

Redoxoma is a multidisciplinary network of investigators focused on redox processes. These processes involve electron transfer reactions via free radicals or non-radical intermediates, and have a unique potential to elucidate biochemical pathways underlying cell and organ (patho) physiology, as well as disease mechanisms and therapeutic targets.

The Center will address issues relevant to overcoming current limitations for the design of effective antioxidant strategies and the investigation of biomarkers of oxidative stress.

The main goal is to perform basic research and to support innovation in pharmaceuticals, medical devices, diagnosis and ecological services. In addition, a core laboratory (Redoxoma Analysis Platform) will be established at USP to provide state-of-the-art analytical tools for the evaluation of redox processes, which will be open for use by clinical and basic researchers. Redox state markers are the key to early detection of risk factors for a number of diseases, assisting effective interventions and maximizing the chances of correcting these conditions.



Study suggests that people with low levels of PDIA1 in blood plasma may be at high risk of thrombosis; this group also investigated PDIA1's specific interactions in cancer (image comparing the migration of Human umbilical vein endothelial cells (HUVECs) cultured in PDI-poor plasma and of HUVECs cultured in PDI-rich plasma into the denuded area created by a pipette tip-inflicted wound (yellow line) within a 24 hour period / Redox Biology)

RESEARCH
AREAS

- ▷ Biomolecule oxidation and function
- ▷ Thiol-based redox proteins
- ▷ Redox signaling
- ▷ Diagnostic and therapeutic applications of redox processes

REDOXOMA

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FAPESP Process 2013/7937-8
Operation period: 2013-2024

 redoxoma.iq.usp.br/?hl=en

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**ASSOCIATED
INSTITUTIONS**

Aarhus University, Denmark
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 Atomic Energy and Alternative Energies Commission (CEA), France
 Boston University, USA
 Butantan Institute (IBu), São Paulo, Brazil
 Centre National de la Recherche Scientifique (CNRS), France
 Emory University, USA
 Federal University of São Paulo (UNIFESP)
 Harvard University, USA
 Heart Institute (INCOR/USP), São Paulo, Brazil
 Liverpool John Moores University, United Kingdom
 National Institute on Aging (NIA), USA
 São Paulo State University (UNESP)
 University of Madrid, Spain
 University of Milwaukee, USA
 University of Rochester, USA
 University of the Republic, Uruguay

**RESEARCH
HIGHLIGHTS**

Molecule that regulates muscle adaptation to exercise is discovered

An article in Cell by researchers affiliated with Harvard and the University of São Paulo shows that the metabolite succinate is released by muscle cells during physical exercise and triggers a process of tissue remodeling that makes muscles stronger and enhances metabolic efficiency.

Researchers discover a link between two important products of nitric oxide

Nitric oxide plays a key role in cardiovascular and neurodegenerative diseases as well as cancer. Experiments reveal a hitherto unknown mechanism underlying the formation of nitroso-thiols.

Enzyme may indicate predisposition to cardiovascular disease

Study suggests that people with low levels of PDIA1 in blood plasma may be at high risk of thrombosis; this group also investigated PDIA1's specific interactions in cancer.



BV-FAPESP
**Research projects
 supported in the
 REDOXOMA**



REDOXOMA in the Media
News about the Center



RESEARCH DISSEMINATION
redoxoma.iq.usp.br/news/index.php

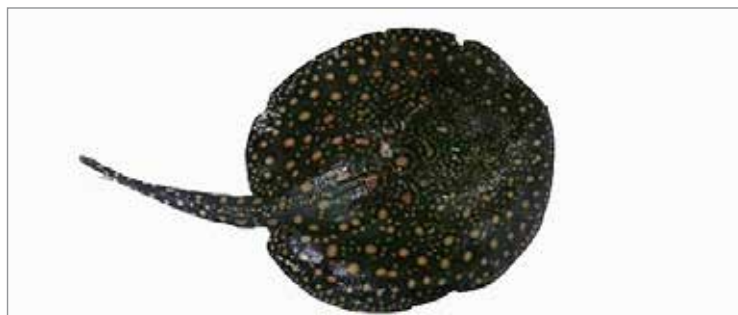
CeTICS mission is to probe into biological systemic responses of cells, tissues or whole organisms using chemically defined peptide toxins as molecular tools with the aim of discovering and chemically characterize molecular targets of toxins, which likely initiate biological responses of interest in human pathophysiology and therapeutics. These targets are critical receptors and/or other mediators, which trigger downstream signaling networks underlying biological homeostatic functions.

RESEARCH
AREAS

- ▷ Integrated studies to understand venom and toxin response.
- ▷ Venom genomics in an evolutionary perspective.
- ▷ Antibodies.
- ▷ Interplay among inflammation, pain and DNA damage.
- ▷ ARTISiN: Amalgam of Repositories and Tools for Identification of Signaling Networks.



*In an article published in PNAS, researchers affiliated with Butantan Institute describe the genome of *Bothrops jararaca* and suggest the origin of genes responsible for toxins in its venom (photo: Rafael Marques Porto/Butantan Institute).*



A study by the FAPESP-funded Research, Innovation and Dissemination Center shows that toxins produced by young female stingrays cause more pain, whereas toxins produced by adult stingrays cause tissue necrosis (photo: Carla Lima)

CeTICS

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Butantan Institute

FAPESP Process 2013/07467-1
Operation period:
2001-2013 / 2013-2024

www.cetics.com.br/en

**ASSOCIATED
INSTITUTIONS**

Albert Einstein Israelite Education and Research Institute (IIEPAE), Brazil
Cardiff University, United Kingdom
Federal University of Minas Gerais (UFMG), Brazil
National Academy of Medicine, USA
São Paulo State University (UNESP)
Stanford University, USA
University of Berlin, Germany
University of Glasgow, United Kingdom
University of Lausanne, Switzerland
Université of Montpellier, France
University of São Paulo (USP), Brazil
University of Toyama, Japan
University of Virginia, USA

**RESEARCH
HIGHLIGHTS**

[Peptide from venomous fish toxin controls lung inflammation in mice](#)

A research group at Butantan Institute performed tests on animal models with asthma as a reference and demonstrated that a peptide from *Thalassophryne nattereri*, common in North and Northeast Brazil, is safe and efficacious.

[First genetic sequencing of Brazilian pit viper is completed](#)

In an article published in PNAS, researchers affiliated with Butantan Institute describe the genome of *Bothrops jararaca* and suggest the origin of genes responsible for toxins in its venom.

[Molecule with potential to treat multiple sclerosis and asthma passes toxicology testing in zebrafish](#)

Study conducted at a FAPESP-supported research center shows that anti-inflammatory peptide TnP could lead to drug development.



BV-FAPESP
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CeTICS in the Media
News about the Center

CeRTEV is an academic research and technology center devoted to glass science and technology. The 9 principal investigators have consolidated a coherent, collaborative research program dealing with fundamental research and development the search for new materials with technologically interesting properties, covering a wide range of potential applications for glasses and glass ceramics.

It conducts fundamental research on structure-property relations, using complementary simulation, spectroscopic, and functional characterization methods. CeRTEV aims to map the "genome" and develop new active glasses and glass-ceramics with promising applications. The Center faculty develop new active glasses and glass-ceramics presenting application-relevant functionalities, such as high mechanical strength and electrical conductivity, biological, optical or catalytic activity, or combinations of these. A fundamental understanding of these properties will be sought on the basis of the structural organization of these materials on different length scales. It deploys state-of-the-art NMR, EPR, EXAFS and vibrational spectroscopy to characterize the local and medium-range order, as well as the full resolution range of optical and electron microscopies, XRD, and microanalyses for elucidating nano- and microstructures. This comprehensive experimental approach is complemented by molecular dynamics simulations an in-depth understanding of glass sintering and crystallization in terms of the mechanisms, thermodynamics, and kinetics of viscous flows, relaxation, and crystal nucleation



Photo by Vladimir Fokin

Orchid-like crystals in the interior of CaO-Li₂O-SiO₂ glass. The crystals are microcracked due to thermal expansion mismatch with the residual glass phase. Polarized optical microscopy.

E.D. Zanotto. Cristais em vidros - Ciência e Arte. EdUFSCar, 124 pags. Dez. 2011.

and growth, enabling the control of these processes by developing appropriate forming process and thermal treatment protocols. The participating laboratories will jointly investigate a number of important benchmark systems deemed promising for applications as structural reinforcement materials (dental and bio glass-ceramics), optical materials (laser glasses), materials for electrochemical energy storage devices (electrolytes, high-temperature seals), and catalytically active systems.

CeRTEV

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Operation period: 2013-2024

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**ASSOCIATED
INSTITUTIONS**

University of São Paulo (USP)
São Paulo State University (UNESP)

**RESEARCH
HIGHLIGHTS**

[Innovative technique obtains glass-ceramic materials faster and saves energy](#)

The technique was developed at the Federal University of São Carlos (UFSCar) in São Paulo State, Brazil, and could impact the manufacturing of batteries, smartphone screens and other devices.

[A magneto-optical fiber to detect extremely weak magnetic fields](#)

Brazilian scientists have developed an innovation that can be used in sensors to monitor brain function with even greater sensitivity than existing devices.

[Novel water decontamination method combines low-cost composites and solar energy](#)

A simple and affordable solution developed by researchers at the University of São Paulo and a Nigerian collaborator eliminates even multi-resistant bacteria. Clay, papaya seeds and banana peel are among the raw materials used by the group.



BV-FAPESP
**Research projects
supported in the CeRTEV**



CeRTEV in the Media
News about the Center



RESEARCH DISSEMINATION
www.certev.ufscar.br/en/education

NEV-USP has been conducting research and training scholars (through an interdisciplinary approach since 1987) on the debate on violence, democracy, and human rights.

NEV-USP was among the pioneer Human Sciences Centers to host a FAPESP Research, Innovation and Dissemination Center (RIDC), becoming a reference to the use of science in Citizenship discussions by developing important longitudinal studies and mixing methodologies and solid data bases.

The current RIDC program is called 'Building Democracy Daily: Human Rights, Violence and Institutional Trust', which hopes to promote and expand studies on the legitimacy of key institutions for democracy as well as how this legitimacy is shaped in the citizens' everyday experience with public services.

The overarching issues involve the complex relationship between the persistence of violence and human rights violations in the course of the Brazilian democratic consolidation process. The aim of the center is to answer questions such as "What type of democracy exists and develops within a context of severe rights violations, organized crime, corruption, impunity, limited civil rights, and frail support for a culture of human rights?", "How do the existing obstacles affect the implementation of laws?" and more recently "How does an inadequate enforcement of laws influence the legitimacy of institutions that are crucial for democracy?"



Photo: Léo Ramos Chaves

The RIDC-NEV counts on the collaboration of researchers from different scholarly Center for the study of violence – nev backgrounds (sociology, psychology, political science, law, anthropology, statistics, history, public health, etc.), as well as a wide range of research methods, including archival analysis, surveys, interviews, observations, georeferencing, etc.

The Center also participates in many research networks. It has been a Collaborating Center of the World Health Organization since 2004, contributing to forums and research projects for violence prevention.

NEV

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FAPESP Process 2013/07923-7

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2001-2013 / 2013-2024

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ASSOCIATED
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Brown University
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Federal University Bahia
Federal University of Juiz de Fora
Fluminense Federal University
Global Cities Synthesis Center in USP Advanced Studies Institute
Institute for Social Research of the J. W. Goethe University in Frankfurt
Institute of Criminology of the Cambridge University
London School of Economics and Political Science
Queen's University of Belfast
RIDC – CeMEAI
School of Public and International Affairs of the North Carolina State University
School of Criminology & Criminal Justice (CCJ) of University of Arizona
University College London
University of California, USA
University of Columbia, USA
University of Manchester
University of Notre Dame
Unifersity of Sheffield Hallam
University of Surrey
World Health Organization

RESEARCH
HIGHLIGHTS

Social inequality makes combating COVID-19 even harder

Study shows that São Paulo City has eight distinct urban groups in economic, social and cultural terms, making effective action against the pandemic a challenge.

Human Rights Extension Project in Schools

NEV's Human Rights Observatory in Schools Project (PODHE) is a human rights education initiative that provides training and experience in human rights to teenagers and youth through the construction of a collaborative space for human rights monitoring.

Violence, democracy and human rights

Enforcing law and order and protecting human rights are fundamental themes of the Center for the Study of Violence, and the mains challenge is to understand why democracy in Brazil has not translated into safeguarding for citizens.



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NEV in the Media
News about the Center



RESEARCH DISSEMINATION
bit.ly/nevusp-signup

FoRC is a network involving academia, private businesses, government, the third sector and society in general, stimulating the dissemination of knowledge and transferring technology to perpetuate a virtuous circle of incentives.

The mission is to enhance and promote health and well-being through research, education and innovation in food science. The goals are to conduct advanced basic and applied interdisciplinary research on food science, establish and strengthen alliances with professional organizations that hold compatible goals, educate diverse communities in the relationship among food science, nutrition and health and promote the professional growth and development of faculty, students and professionals in these areas.

Apart from advancing scientific knowledge, FoRC aims to develop innovative products and processes with positive social and economic impact. Another goal is human resource development and training, to meet technological and social needs in food science and nutrition.

Open Innovation FoRC develops R&D in partnership with public and private enterprises and also non-governmental organizations (NGOs), and provides consultancy and technical assistance. These activities are carried out with support from the University of São Paulo's Innovation Agency, responsible for managing innovation policy to promote the use of scientific, technological and cultural knowledge produced at the university.



Scientists affiliated with the Food Research Center in Brazil are working to improve industrial feasibility of disruptive technologies such as the packaging that warns costumers when food starts spoiling (biofilm made from cassava starch (photo: Bianca Chieregato Maniglia / FoRC).

RESEARCH PILLARS

- ▷ Biological Systems in Foods
- ▷ Food, Nutrition and Health
- ▷ Food Quality and Safety
- ▷ New Technologies and Innovation for a Healthy Life

FoRC

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School of Pharmaceutical Sciences (FCF)
Polytechnic School (EP)
Faculty of Animal Science and Food Engineering
Luiz de Queiroz College of Agriculture (ESALQ)
Faculty of Medicine (FM)
Faculty of Public Health (FSP)

FAPESP Process 2013/07914-8
Operation period: 2013-2025

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ASSOCIATED INSTITUTIONS

Mauá Institute of Technology (IMT)
 School of Medicine of São Paulo State University (FMB-UNESP)
 Faculty of Food Engineering of State University of Campinas (FEA-UNICAMP)
 Federal Institute of Minas Gerais (IFMG)

RESEARCH HIGHLIGHTS

[Innovative packaging may soon be mass-producible](#)

Scientists affiliated with the Food Research Center in Brazil are working to improve industrial feasibility of disruptive technologies such as the packaging that warns costumers when food starts spoiling.

[Sanitized ready-to-eat salad may contain disease-causing bacteria](#)

A review of research on minimally processed vegetables highlights cases of unsatisfactory microbiological safety and calls for best practice assurance throughout the supply chain.

[Brazilian Food Composition Table \(TBCA\)](#)

This theme focuses on centralizing information on the chemical composition of Brazilian foods. The TBCA data profile, with each new version, reflects the evolution of the area's development in the country, including both the analytical and compilation aspects. Version 7.2 contains data on more than 5,700 foods, with more than 4,000 preparations, and on different types of food (texture-modified, gluten-free, lactose-free, and/or vegan and vegetarian) to allow the evaluation of the nutrient intake and facilitate the assessment of food consumption, in addition to menu preparation.



BV-FAPESP

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FoRC in the Media

News about the Center



RESEARCH DISSEMINATION

forc.net.br/presentation-3



Folder FoRC
Science for a Healthy Life

HUG-CELL conducts research in human and medical genetics, provides genetic counseling service and genetic tests for the public, and conducts activities related to genetics education and technology transfer. The HUG-CELL is the largest center for attending people with genetic diseases in Latin America. Since 2000, some 100.000 people from families affected by different genetic pathologies have been attended by a multidisciplinary team.

In addition, the Center develops research on mechanisms of genetic diseases, aiming the identification of targets for therapies, and on emerging topics that are relevant to society, such as the genetic susceptibility responsible for microcephaly in babies exposed to zika virus which opened a new field of research indicating that zika virus can represent a novel therapy for brain tumors.

HUG-CELL is currently involved in the following projects:

▷ **Xenotransplantation**

In the last five years, we successfully generated the first triple-knockout pig embryos for xenotransplantation, in collaboration with a team from FMUSP. These embryos are now being transferred to surrogate sows. Additionally, several human transgenes are currently being inserted into the TKO pig's genome to modulate the potential immune response. To produce medical-grade pigs for xenotransplantation, we partnered with IPT, and to perform pre-clinical studies, we partnered with USP Medical School, Heart Institute (InCor) and Unifesp Medical School.

▷ **Advanced cancer therapies**

We investigate advanced therapies including CAR-T, CAR-NK cells, RNA and oncolytic viruses such



Extracellular matrix of a decellularized liver. An extracellular matrix obtained by controlled decellularization is used to reconstruct the liver with human-like characteristics (photo: HUG-CELL/USP).

as zika in different types of brain tumors obtained from surgeries or in dogs with spontaneous brain tumors.

▷ **Novel protective variants and mechanisms responsible for elucidating clinical variability in the progression of muscular dystrophies**

Using different multiomic approaches and functional studies, in vitro and in animal models, we are investigating clinical variability in different forms of muscular dystrophy in order to elucidate the underlying pathological mechanisms. GRMD dogs (the canine model for Duchenne muscular dystrophy) and rare Duchenne muscular dystrophy patients are being investigated to open up new avenues for treatment.

HUG-CELL

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HOST INSTITUTION
University of São Paulo (USP)

FAPESP Process 2013/08028-1
Operation period:
2001-2013 / 2013-2024

 www.genoma.ib.usp.br

▷ **Developmental and neurodegenerative disorders**

Research on autism spectrum disorder (ASD) and mechanisms associated with intellectual disability is currently under way, contributing to the identification of novel disease-associated genes and showing that the study of three generations of probands is a promising strategy to dissect the genetic architecture of ASD. We are also investigating mechanisms responsible for neurodegenerative disorders such as Alzheimer's and Parkinson's.

▷ **Gene-environment interaction using oral-facial cleft as a model**

Our researchers demonstrated in vitro and in vivo that murine embryos with a deficiency of e-cadherin (CDH1-/CDH1-) in neural crest cells and exposed to inflammation developed cleft palate, possibly through epigenetic regulation of CDH1. These findings, which confirmed a hypothesis based on genetic analysis of families with mutations in CDH1, provided an opportunity to investigate gene-environment interaction for oral-facial clefts and other genetic alterations.

▷ **Healthy longevity**

The world population is getting older, and studies focusing on health span are therefore extremely important. Genetics is known to play a major role in maintaining cognitive and physical health in the over-90s. We are conducting research on centenarians to identify genetic variants and mechanisms responsible for maintaining health in these exceptional individuals.

ASSOCIATED INSTITUTIONS

University of Southampton, UK
 Université Lyon / INSERM, France
 University of Toronto, Canada
 University of Groningen, The Netherlands
 Harvard Medical Center, Boston, USA
 Institute of Myology, Paris
 Hospital Israelita Albert Einstein, Brazil

ICESP (Instituto do Câncer do Estado de São Paulo);
 AC Camargo Cancer Center, Brazil
 Instituto de Ciências Biomédicas-USP;
 USP Medical School
 Institute for Technological Research (IPT), Brazil
 Heart Institute (InCor), Brazil
 Unifesp Medical School, Brazil

RESEARCH HIGHLIGHTS

[New studies enrich knowledge of genetic factors that naturally protect people against COVID-19](#)

A team at a FAPESP-supported research center investigated over-90s who were resilient to SARS-CoV-2 and identical twins who had severe COVID-19 with different outcomes, including long COVID.

[Whole-genome database will help refine diagnosis of genetic diseases in Brazil](#)

Whole-genome sequences from 1,171 elderly people living in São Paulo City were analyzed to detect mutations responsible for disease or that play a key role in healthy aging.

[Researchers develop a technique to produce transplantable livers in the laboratory](#)

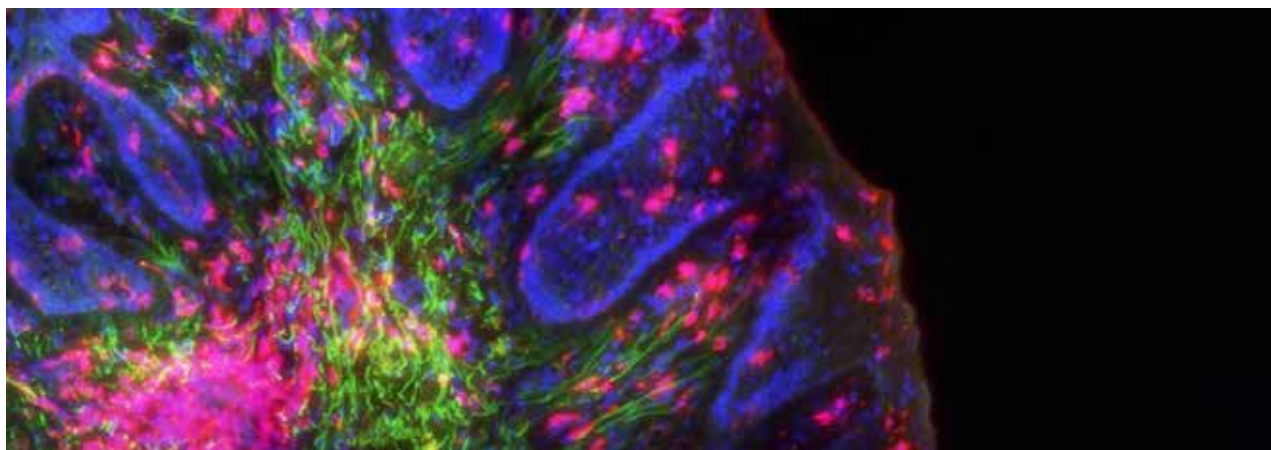
An extracellular matrix obtained by controlled decellularization is used to reconstruct the liver with human-like characteristics.



BV-FAPESP
Research projects supported in the HUG-CELL



HUG-CELL in the Media
News about the Center



Credit: OCRC

OCRC coordinates scientific efforts to find solutions for obesity, a disease highly associated with a number of serious health problems such as type 2 diabetes, hypertension, atherosclerosis and certain kinds of cancer. The overall mortality directly and indirectly associated with obesity is rapidly increasing in Brazil and the world – so much so that it is considered a global epidemic.

The Center is constantly in contact with industry and other potential users of the knowledge and products obtained through its research in order to speed up the transfer of discoveries to society.

OCRC

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FAPESP Process 2013/07607-8
Operation period: 2013-2024

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**ASSOCIATED
INSTITUTIONS**

University of São Paulo (USP)
São Paulo State University (UNESP)
Federal University of São Paulo (UNIFESP)

**RESEARCH
HIGHLIGHTS**

Infection of visceral fat cells may contribute to severe COVID-19, study suggests

Brazilian researchers infected fat cells from subcutaneous and visceral tissue with SARS-CoV-2. Fat cells from organs in the abdominal cavity had a higher viral load and produced more pro-inflammatory molecules after contact with the virus.

Protein restriction can be effective in combating obesity and diabetes, study suggests

Twenty-one patients with metabolic syndrome were given a calorie or protein restriction diet in a randomized clinical trial by Brazilian and Danish researchers. Weight loss, controlled blood pressure and improved blood sugar and lipid levels were observed in all participants.

Experimental treatment prevents Alzheimer’s-associated weight gain in mice

In a study conducted at a FAPESP-funded research center, a bile acid derivative known by the acronym TUDCA reduced food intake and increased energy expenditure in mice, improving quality of life. The results are promising for humans.



BV-FAPESP
**Research projects
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OCRC in the Media
News about the Center



RESEARCH DISSEMINATION
ocrc.org.br/en_US/difusao

CePOF's research program consists of cold-matter physics, plasmonics, and biophotonics. It advances fundamental knowledge and develop innovative, practical applications.

Turbulence in quantum gases, light-matter entanglement of photons and cold atoms, and optical methods for precision time and frequency metrology define the focus of cold-matter physics. Nanoplasmonics takes optics beyond the diffraction limit, introducing new perspectives for confinement and transport of quantum gases, and for the development of ultrasensitive, rugged biosensors. A modern nanofabrication facility will provide support to all science and technology projects. In biophotonics, the studies focus on the diagnosis and treatment of diseases using purely optical techniques.

The areas of Cold Matter Physics, Plasmonics and Biophotonics are linked by a common theme, which is the interaction of light with matter.



Photodynamic therapy developed by the Center for Research in Optics and Photonics, which is supported by FAPESP, has been recommended by Brazil's federal body responsible for including novel healthcare technologies in the national health service (image: CEPOF).

RESEARCH AREAS

▷ Atomic and Molecular Physics

- Bose-Einstein Condensates
- Scientific Metrology of Time and Frequency
- Atomic condensates and mixtures
- Cooperative Spreading & Optical Networks
- Two-dimensional quantum gases
- Dipolar Quantum Gases
- Quantum Technologies
- Quantum Sensors & Matter Wave Interferometry

▷ Plasmonic

- Plasmonics and Nanophotonics
- Plasmonic Metamaterials

▷ Biophotonics

- Ultraviolet Disinfection
- Sonophotodynamic Therapy
- Optical Diagnosis
- Photodynamic Therapy
- Photobiomodulation
- Organic Synthesis
- Applied Optics to Agriculture and the Environment

CEPOF

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FAPESP Process 2013/07276-1
Operation period:
2001-2013 / 2013-2024

 cepof.ifsc.usp.br

**ASSOCIATED
INSTITUTIONS**

Brazilian Agricultural Research Corporation (EMBRAPA)
Federal University of São Carlos (UFSCAR)
São Paulo State University (UNESP)
Araraquara University (UNIARA)

**RESEARCH
HIGHLIGHTS**

[Innovation to treat skin cancer will be used by Brazil's public health clinics](#)

Photodynamic therapy developed by the Center for Research in Optics and Photonics, which is supported by FAPESP, has been recommended by Brazil's federal body responsible for including novel healthcare technologies in the national health service.

[Nanophotonic circuits could revolutionize data processing](#)

A study conducted at a FAPESP-supported research center shows that light interacting with free electrons in a metal can traverse nanometric structures far smaller than its wavelength.

[Light-based therapies achieve good results in rehabilitation of patients with post-COVID complications](#)

Devices that combine laser irradiation, ultrasound and suction help regenerate tissue and treat muscle, joint, skin, neurological and lung damage. Protocols created via business-university partnerships are being tested and can be applied by treatment centers across Brazil.



BV-FAPESP
**Research projects
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CEPOF in the Media
News about the Center

The mission of the Center is to develop the new mathematics needed to construct a Theory of the Brain accounting for the experimental data gathered by neuroscience research.

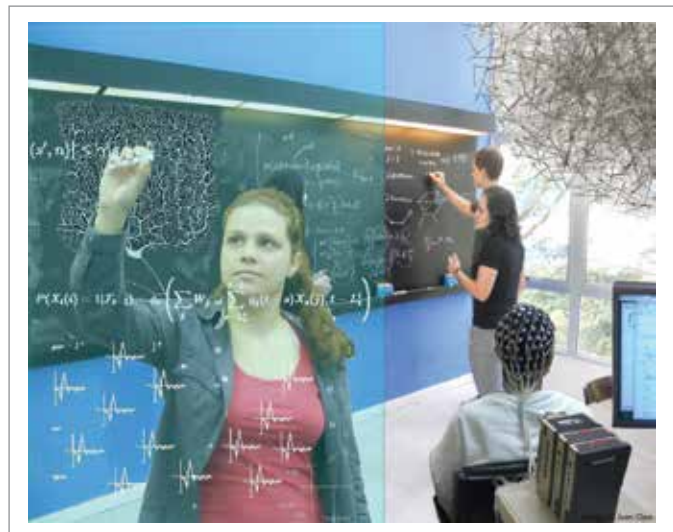
This calls for the development of a new approach – neuromathematics – conjoining probability theory, combinatorics, statistics, computer science and neuroscience. In this approach, a new class of mathematical models must be introduced to describe and explain in a parsimonious way the different scales of neural activity and their relationship. The construction of these models, however, should marry the simultaneous development of suitable statistical and computational methods, including model selection principles and results.

To test and construct large-scale computational implementations of the models developed by its scientific team, NeuroMat has established a High-Performance Computational Center capable of simulation large-scale network models.

It has an interdisciplinary team, comprising researchers in mathematics, computer science, statistics, neuroscience, biology, physics, and communication, among other disciplines.



Credit: Pixabay.



The Center integrates the development of new mathematics with basic and applied research at the frontier of neuroscience. Photo by Juan Ojea

NEUROMAT

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FAPESP Process 2013/07699-0
Operation period: 2013-2024

 neuromat.numec.prp.usp.br

**ASSOCIATED
INSTITUTIONS**

Centre National de la Recherche Scientifique, France
Federal University of Minas Gerais
Federal University of Ouro Preto
Federal University of Pernambuco
Federal University of Rio de Janeiro
Federal University of Rio Grande do Norte
Federal University of Rio Grande do Sul
Federal University of São Carlos
Gran Sasso Science Institute, Italy
IBM Thomas J. Watson Research Center, USA
Institute of Pure and Applied Mathematics
Princeton University, USA
Rockefeller University, USA
Sapienza Università di Roma, Italy
State University of Campinas
Strasbourg University, France
Universidad de Buenos Aires, Argentina
Universidad de la Republica, Uruguay
Universidad de San Andrés, Argentina
Universidad Nacional de Córdoba, Argentina
Université de Cergy Pontoise, France
Université Paris Descartes, France
Universiteit Utrecht, The Netherlands
University of Memphis, USA

**RESEARCH
HIGHLIGHTS**

[Studies use mathematics to analyze the semantics of dream reports during the pandemic](#)

Researchers at a center for neuromathematics say dreams reflect the fear and anxiety fueled by the disease.

[NeuroMat is the leading producer of mathematics content on Wikipedia](#)

NeuroMat has created more than 4,000 Wikipedia entries and improve more than 21,000.

[Using mathematics to translate the brain](#)

Collaborators with NeuroMat discuss the use of random graphs to study neuronal and brain region connectivity.



BV-FAPESP
**Research projects
supported in the
NeuroMat**



NeuroMat in the Media
News about the Center

The Antimicrobial Resistance Institute of São Paulo (ARIES) enables researchers from five universities in São Paulo to work with experts from public organizations (EMBRAPA, CETESB) and representatives of the Ministry of Agriculture, Livestock and Food Supply, the Ministry of Health, Brazilian Health Regulatory Agency (ANVISA) and the Pan American Health Organization (PAHO).

In a pioneering initiative, the ARIES Project combats Antimicrobial Resistance (AMR) by implementing the concepts of Global Health and One Health. Mitigation of the AMR threat requires a multidisciplinary approach that recognizes and interferes in the drivers of AMR in the human-animal-environment interface.

Established in 2023, ARIES pursues its goals on the following fronts:



Credit: Wikipedia

**KEY
OBJECTIVES**

- ▷ Socio-Environmental Observatory and Data Science Center: surveillance of ecosystems involved in the emergence and spread of AMR
- ▷ Characterization of microbial evolution, mechanisms of AMR and microorganism fitness and pathogenicity
- ▷ Development and validation of new strategies for control and prevention of AMR in humans, animals, and the environment
- ▷ Translation of successful initiatives to Business and Public Health Policies
- ▷ Diffusion of ARIES – Knowledge in connection with Society, Education and Dissemination.



BV-FAPESP
**Research projects
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Aries Project**

ARIES Project

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FAPESP Process 2021/10599-3
Operation period: 2023-2028

Established in 2023, CCARBON develops innovative solutions and strategies in sustainable, carbon-based tropical agriculture to mitigate climate change and improve living standards and conditions. Its main objectives are to generate knowledge, technology, innovation, human resource training and dissemination of carbon-based solutions for tropical agricultural systems and to reconcile the growing demand for food, fiber and energy with sustainability (environmental, economic and social).

It identifies key challenges and implements solutions to increase sustainable agri-food production of tropical agricultural systems (with a focus on annual crops; i.e. soybeans, corn, cotton, cover crops, sugarcane, pastures, integrated systems such as agriculture-livestock-forestry and agroforestry programs, and forestry/ecological restoration), reducing GHG emissions, and increasing C sequestration through practices of low-carbon agriculture management.

It is embedded in an innovation ecosystem to support discoveries and new technologies through institutional public-private partnerships.

CCARBON deploys multiple strategies for the active dissemination of knowledge and



Photo: Léo Ramos Chaves.

innovations, helping farmers and stakeholders adopt more sustainable practices, as well as making the population aware of the relevance of issue involved and supporting the development of public policies. It aims to identify key challenges, and to develop and implement solutions to increase food, fiber and sustainable (bio)energy production in tropical ecosystems. The results will pave the way for a low-C economy and promote sustainable social development for decades to come.

RESEARCH AREAS

- ▷ Soil
- ▷ Plant
- ▷ Animal
- ▷ Atmosphere
- ▷ Digital tools.



BV-FAPESP
Research projects supported in the CCARBON

CCARBON

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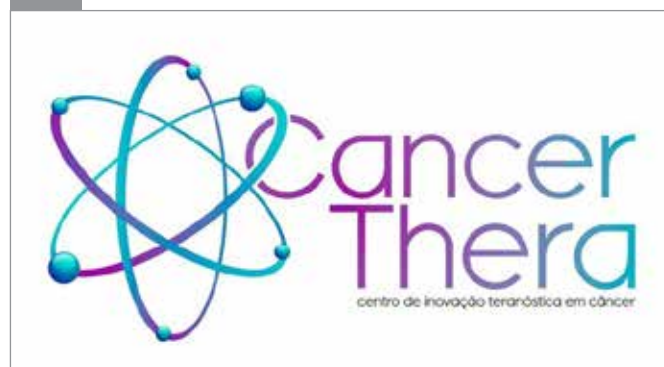
FAPESP Process 2021/10573-4
Operation period: 2023-2028

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Established in 2023, CancerThera focuses on innovating in an area of medicine known as theranostics, which involves using nanotechnology to diagnose and treat cancer. The center conducts research, innovation and knowledge dissemination activities relating to the creation of new metal-based drugs and radiopharmaceuticals for the diagnosis and treatment of cancer. It also studies new uses for known radiopharmaceuticals. Its researchers from various knowledge areas, including Clinical Oncology, Onco-Hematology, Chemistry, Nuclear Medicine, Pharmacy, Statistics, Biology and Physics, uses an innovative model, to become a world-class center in the study of cancer.

RESEARCH AREAS

▷ **Basic Research:** bioactive molecules, such as nucleotide analogues and semicarbazones among others, will be used to synthesize new metallo-drugs for the diagnosis and blocking of tumor cell replication. New metal chelation systems of the type bis (semicarbazones) and bis (thiosemicarbazones) will be emphasized. These and other chelators will be conjugated with several peptides related to the tumor microenvironment. The compounds will be radiolabeled mainly with the gallium-68/lutetium-177 pair – which respectively enable the diagnosis and treatment (theranostic) of neoplasms – in addition to other radioisotopes. The biodistribution and anti-tumor action of the compounds will be evaluated in



several preclinical studies, including gamma counter analyses, images in micro-PET/SPECT/CT equipment, assays focusing on antiproliferative activity and cell death in tumor cell lines and inflammation/gene expression assays of toxicity and efficacy in animal models.

▷ **Clinical Research:** new uses for molecules already known, such as prostate-specific membrane antigen (PSMA), to be used only in non-prostatic neoplasms, and the fibroblast activation protein inhibitor (FAPI). With the existing radiopharmacy infrastructure in the host institution, in addition to the current international project, several radioisotopes will be used to mark these substances that will be tested for the diagnosis and possible treatment of various neoplasms. Research will focus initially on multiple myeloma, indolent lymphomas, colorectal cancer, glioblastoma multiforme,

CancerThera

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FAPESP Process 2021/10265-8
Operation period: 2023-2028

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squamous cell carcinoma of the head/neck and skin, and Ph1-negative chronic myeloproliferative diseases (mainly primary myelofibrosis) will be initially studied. The genetic of the catchment lesions will be made.

The Basic and Clinical Research of CancerThera, will interact continuously in an unprecedented model in the country in this area. Radiopharmaceuticals successfully produced

in Basic Research will be used in phase 1 and eventually phase 2 clinical trials. Basic Research will monitor radiolabeling of new applications of known drugs. To ensure appropriation of the results by society, different actors and institutions will be connected: researchers, students, research institutions, national and international funding agencies, small and large companies, governments (state and municipal), the press and society.

**ASSOCIATED
INSTITUTION**

School of Medical Sciences, Santa Casa de São Paulo
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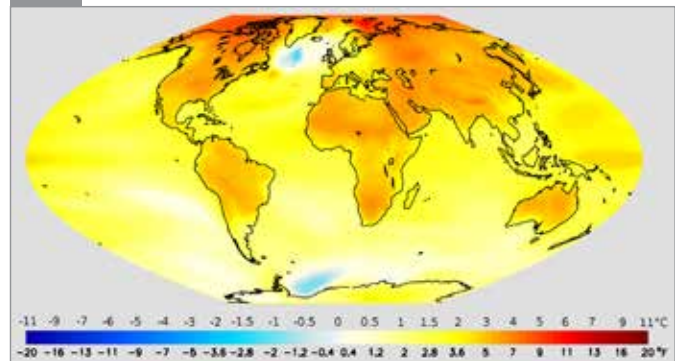
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CancerThera**



CancerThera in the Media
News about the Center

Established in 2023, CBioClima is a unique and innovative RIDC that brings together experts in science, diffusion and innovation to produce world-class research and solutions at the knowledge frontier on the current loss of biodiversity, its synergies with climate change, and its consequences for human well-being.

Framed by United Nations Sustainable Development Goals (SDGs) 15 – Life on Earth and 13 – Climate Action, it aims to develop a research observatory on biodiversity and climate change, promoting innovation with a focus on nature-based solutions and accelerating the diffusion of knowledge, aligned with SDGs 4 – Quality Education and 5 – Gender Equality.



Projection of global warming until the middle of the 21st century (Wikipedia).



**ASSOCIATED
INSTITUTION**

Institute of Biology, State University of Campinas (IB-UNICAMP)



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CBioClima in the Media
News about the Center

BioGate

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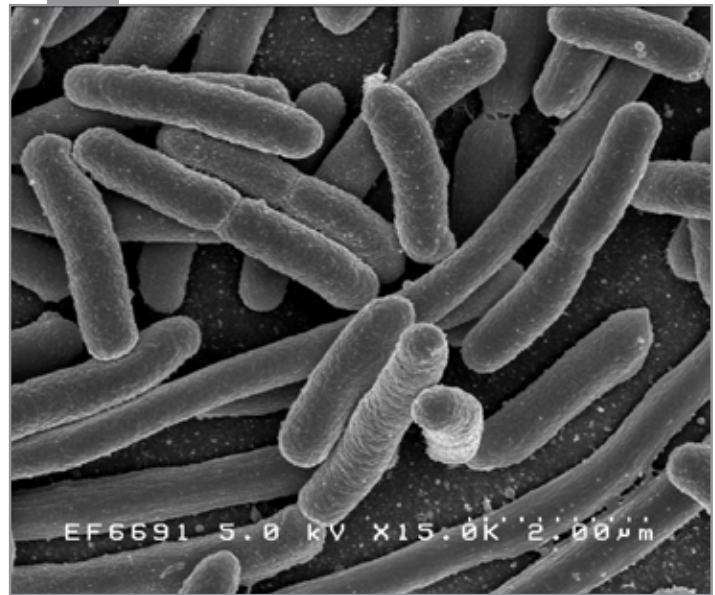
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FAPESP Process 2021/10639-5
Operation period: 2023-2028

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The RIDC B³ conducts cutting-edge basic research into molecular mechanisms that are of prime importance to understand bacterial reproduction, multicellular behavior, competition, colonization, and interactions with eukaryotic hosts and bacteriophages. The acquired knowledge will be used in research and development regarding new chemical and biological inhibitors of bacterial growth.



Escherichia Coli (crédito: Rocky Mountain Laboratories, NIAID, NIH).

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B³ in the Media

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B³

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FAPESP Process 2021/10577-0
Operation period: 2023-2028

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Precarious housing – slums and informal settlements – represents a key challenge, both for academia and the policy community involved in the design and decision making processes related to the finance, regulation and intervention in the built environment.

The main theoretical approaches that have been developed to describe the emergence and state interventions in informal settlements during the twentieth century have been unable to catch up with the scale, complexity and multifaceted socio-environmental entanglements between contemporary slums and cities.

The justification behind the creation of the Center for Studies on Slums is to fill this gap, generate and disseminate new knowledge to increase our understanding of the phenomenon, as well as the limits and potential of upgrading programs and policies in the contemporary urban setting.

Its focus is on building theoretical, methodological and empirical approaches, with a quantitative and qualitative bias, on the multifaceted and complex nature of the favela, as well as understanding the limits and potential of state interventions in favela territories. Through an interdisciplinary approach, the Center seeks to generate and disseminate knowledge to broaden the understanding of the phenomenon, as well as the limits and potential of improvement programs and policies in the contemporary urban context.

It will do so through a work plan that articulates three dimensions:

- (i) Slum analytics and modeling;
- (ii) Slum dynamics in critical urban studies;
- (iii) Statecraft for slum upgrading.



Credit: Tânia Rego/Agência Brasil.

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FAPESP Process 2022/12259-8
Operation period: 2024-2029



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National Institute for Space Research (INPE)

Faculty of Architecture and Urbanism at USP

Ministry of Cities

Brazilian Institute of Geography and Statistics (IBGE)

National Union for Popular Housing (UNMP)

Escuela de Planeación Urbano Regional of the National University of Colombia

Indian Institute for Human Settlements (IIHS)

School of the Built Environment at Oxford Brookes University (England)

Geographic Data Science Lab The University of Liverpool (England)

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