
Science and Technology in the State of São Paulo, Brazil

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Science Director

São Paulo Research Foundation, FAPESP

Brazil: 206 million people, 7th GDP



Brazil



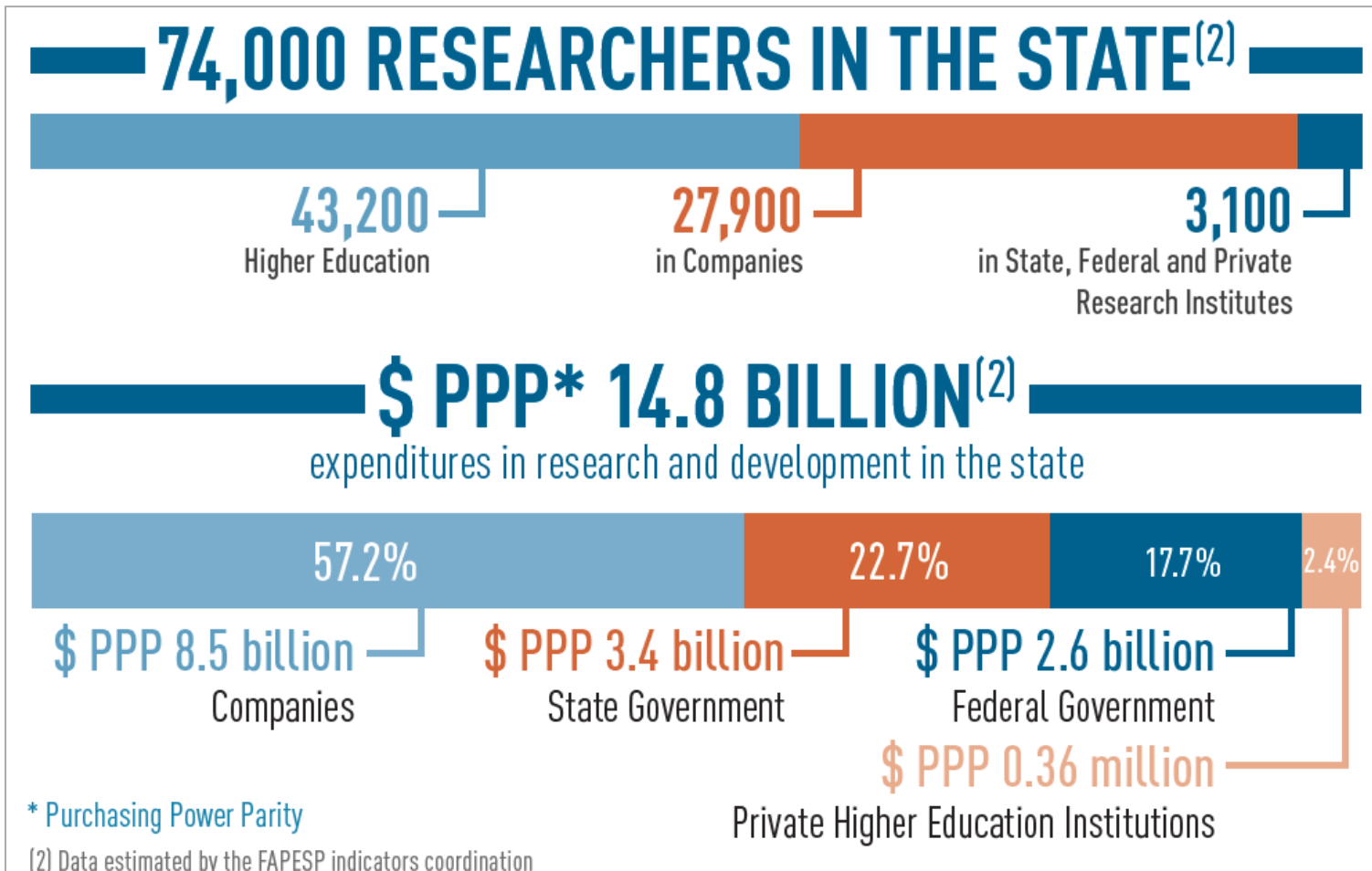
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State of São Paulo, Brasil

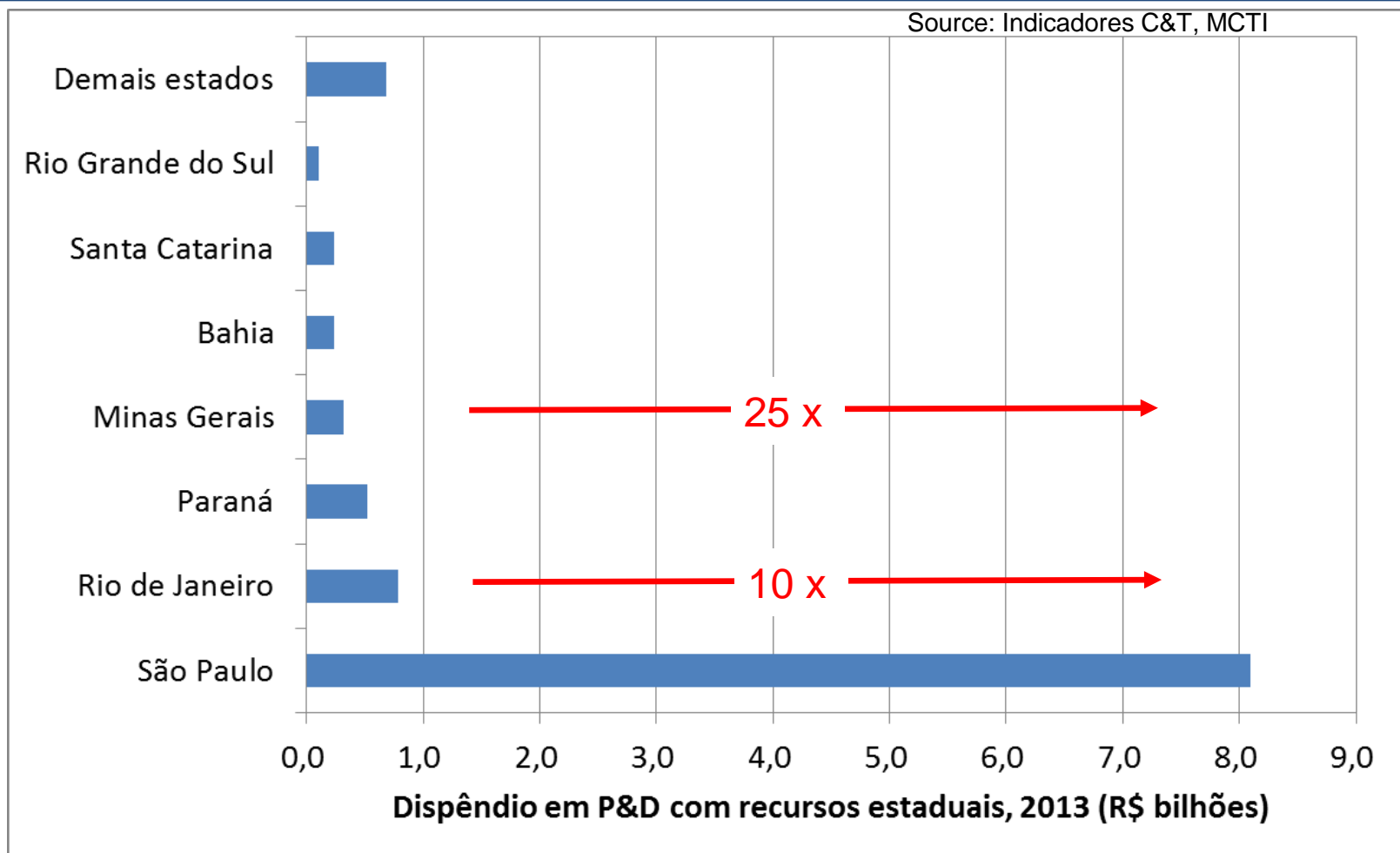


42	Million people
32%	of Brazil's GDP
45%	of Brazilian science
13%	of State budget to HE and R&D
1.7%	GDP for R&D
3	State Universities
3+1	Federal H.E. institutions
52	State Tech Faculties
45%	of the PhDs graduated in Brazil (6,131 in 2014)
22	Research Institutes (19 state/3 federal)

The S&T system in the state of São Paulo, Brazil

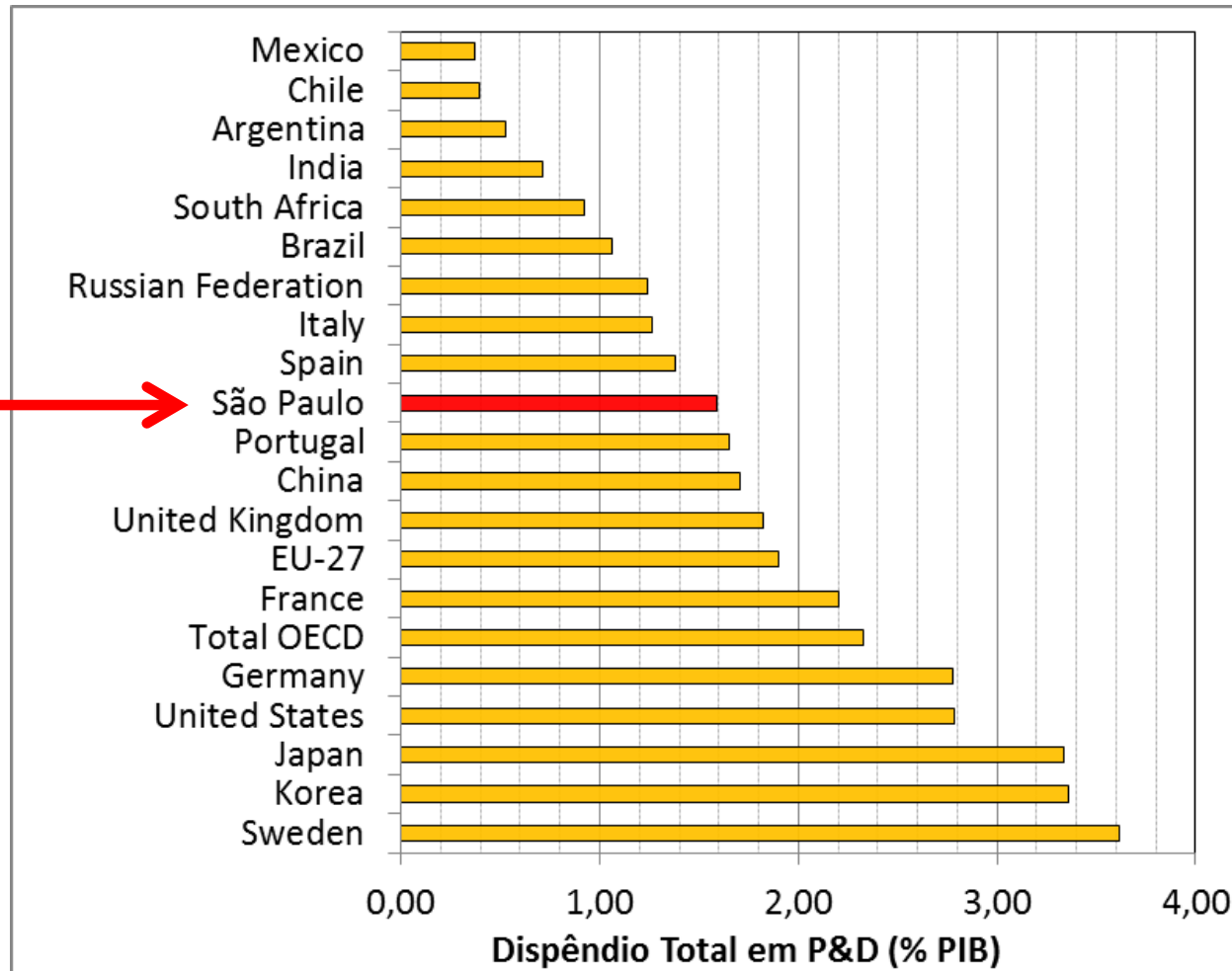


Brazil: State R&D expenditures, 2013



São Paulo R&D Expenditures

International comparison

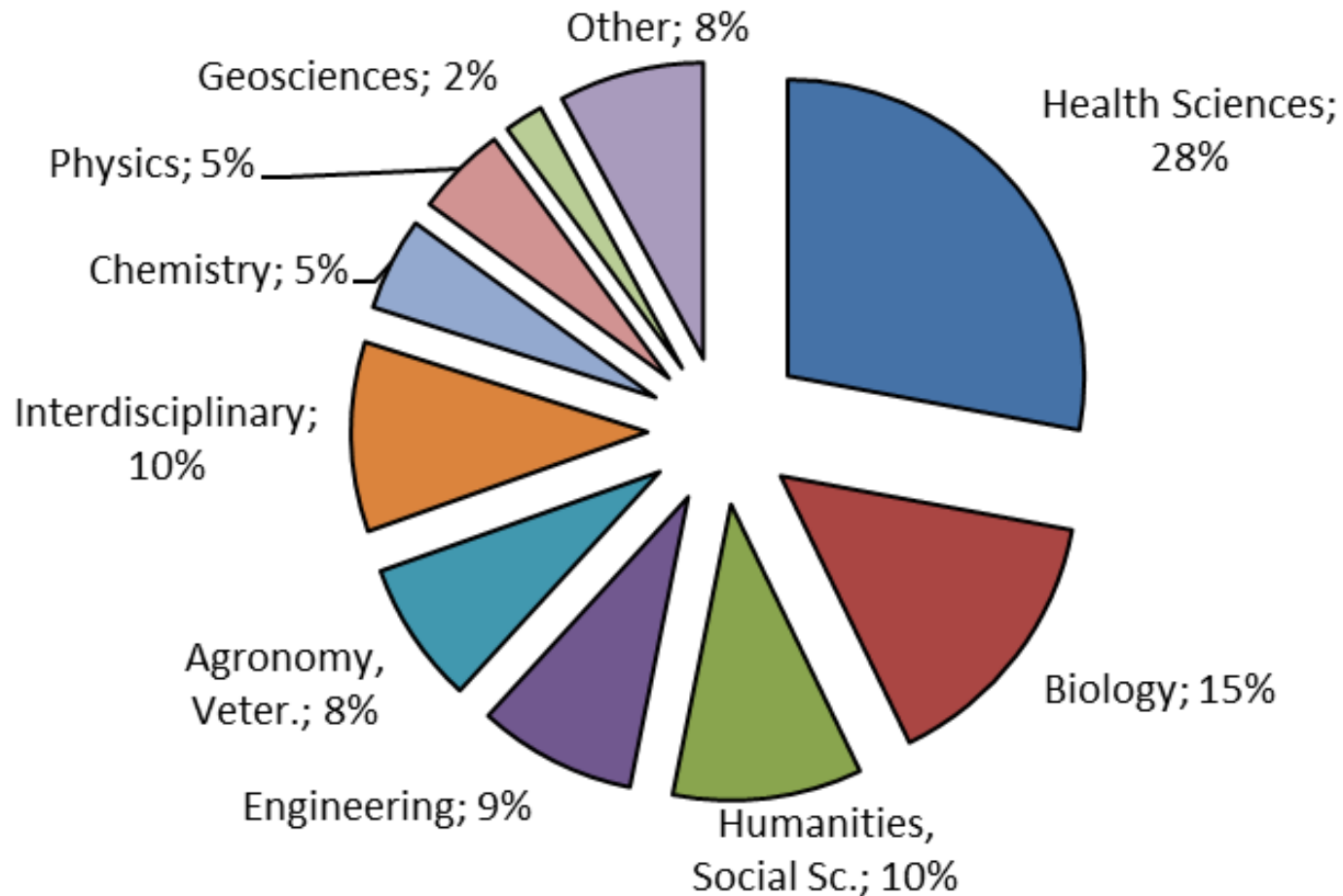


Fapesp: São Paulo Research Foundation

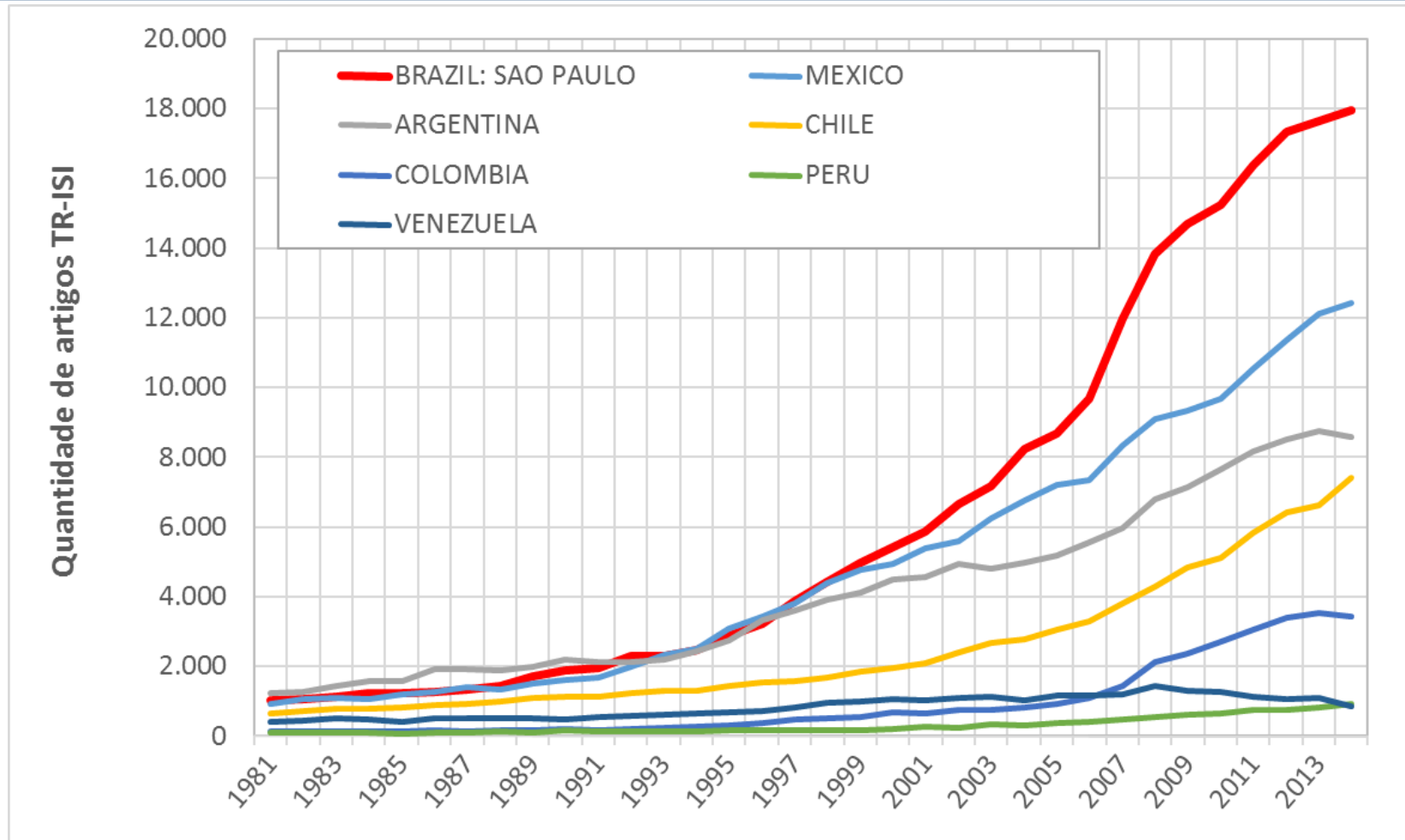
- Mission: support research in all fields
- Funded by the State of São Paulo with 1% of all state revenues
- All proposals are peer reviewed (25,000 proposals in 2015)
 - Average time for decision– 64 days; 40% success rate
- Annual budget: \$PPP 650 million in 2016
 - Fellowships
 - In Brazil: 2,000 SI, 1,100 MSc, 3,000 DrSc, 2,000 Post-docs, 800 other
 - Abroad: 1,200 per year
 - Academic R&D
 - RIDC/11 years, Thematic/5 years, Young Investigators/4 years, Regular/2 years
 - University-Industry Joint R&D: Microsoft, Agilent, Braskem, Oxiteno, SABESP, VALE, Natura, Petrobrás, Embraer, Padtec, Biolab, Cristalia, Whirlpool, Boeing, Astra-Zeneca, Intel
 - Engineering Res. Centers: 10 years joint grants FAPESP/Industry – PCBA, GSK, Natura, BG
 - Small bussiness R&D (PIPE): 1,500 SBE's (three awards per week in 2015)

FAPESP expenditures, 2015

Total: R\$ 1.188 billion



São Paulo creates more articles than any country in Latin America





Invertebrate Systematics

NITRIC OXIDE
Biology and Chemistry

Cancer Research

PHARMACEUTICAL RESEARCH
An Official Journal of the American Association of Pharmaceutical Scientists

nature
SINK OR SOURCE?
Crushed bubbles burst through hot carbon, and expel a stream of hydrogen

Journal of the American Chemical Society

The Journal of Chemical Physics

Zeitschrift für Kristallographie
NEW CRYSTAL STRUCTURES

NCS

nature
Citrus pathogen sequenced
Science Signaling

nature biotechnology

Microbes and Infection

Analyst

PCCP
Physical Chemistry Chemical Physics

Analyst

CrystEngComm

JOC
The Journal of Organic Chemistry

Science

LANGMUIR
The ACS journal of fundamental interface science

CERN COURIER

MARINE & FRESHWATER RESEARCH

CHEMPHYSICHEM
OF CHEMICAL PHYSICS AND PHYSICAL CHEMISTRY
Long-Lasting Oscillations keep going...

PHYSICAL REVIEW LETTERS

Acta Crystallographica Section E Structure Reports Online
Editors: W. T. A. Harrison, J. Simpson and M. Weil

Science

JOC
The Journal of Organic Chemistry

cellular microbiology

METEORITICS & PLANETARY SCIENCE

JOURNAL OF MATERIALS SCIENCE

Cell

Journal of NANOSCIENCE and NANOTECHNOLOGY

Acta Crystallographica Section E Structure Reports Online

ZEITSCHRIFT FÜR KRISTALLOGRAPHIE

THE JOURNAL OF PHYSICAL CHEMISTRY

PHYSICAL REVIEW LETTERS
Articles published week ending 7 FEBRUARY 2003
Volume 90, Number 5

BAMS
Storm over Brazil

Science
PATH TO A ZIKA INOCULUM

nature REVIEWS

NEUROSCIENCE

JOC
The Journal of Organic Chemistry

Journal of NANOSCIENCE and NANOTECHNOLOGY

ZEITSCHRIFT FÜR KRISTALLOGRAPHIE
Volume 223 7/2008

ADVANCED FUNCTIONAL MATERIALS

PHYSICAL REVIEW LETTERS
Published by The American Physical Society

How did Man come to America?

OPEN ACCESS Freely available online

PLoS one

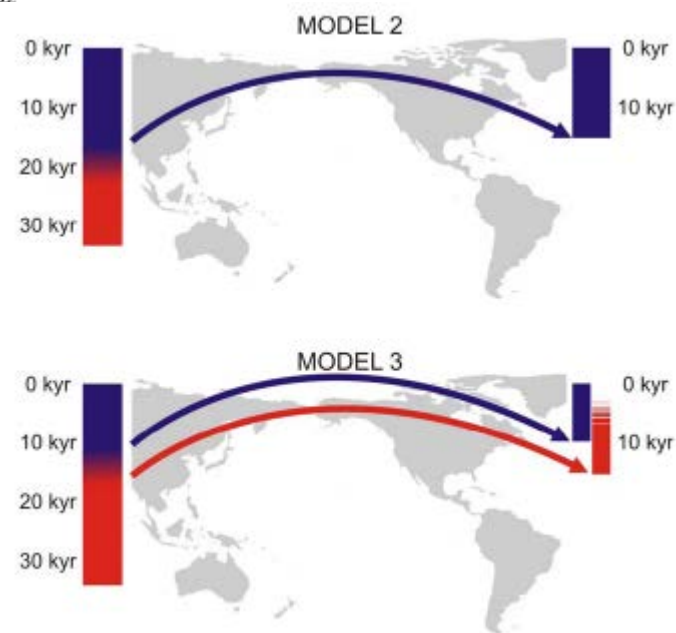
Testing Evolutionary and Dispersion Scenarios for the Settlement of the New World

Mark Hubbe^{1*}, Walter A. Neves², Katerina Harvati³

¹Instituto de Investigaciones Arqueológicas y Museo, Universidad Católica del Norte, San Pedro de Atacama, Chile, ²Laboratório de Estudos Evolutivos Humanos, Departamento de Genética e Biologia Evolutiva, Instituto de Biociências, Universidade de São Paulo, São Paulo, Brazil, ³Paleoanthropology Section, Institut für Uhr- ur Frühgeschichte und Archäologie des Mittelalters and Senckenberg Center for Human Evolution and Paleoecology, University of Tübingen, Tübingen, Germany

Abstract

Background: Discussion surrounding the settlement of the New World has recently gained momentum with advances in molecular biology, archaeology and bioanthropology. Recent evidence from these diverse fields is found to support different colonization scenarios. The currently available genetic evidence suggests a "single migration" model, in which both early and later Native American groups derive from one expansion event into the continent. In contrast, the pronounced anatomical differences between early and late Native American populations have led others to propose more complex scenarios, involving separate colonization events of the New World and a distinct origin for these groups.



SOAR: Southern Observatory for Astrophysical Research

J.B. Haislip et al. "A..."
Nature 440, 1



Infrared afterglow
unveils the explosion
billion years ago.
These results demonstrate
used to trace the star formation
and reionization history of the
Universe.

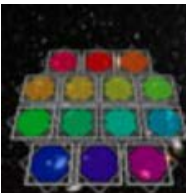
Starting 2014:



Large Latin American Millimeter Array



GIANT MAGELLAN
TELESCOPE



Javalambre
Physics of the Accelerating Universe
Astrophysical
Survey

50904",



USP, UFRGS, UNC Ch.Hill
Fapesp, CNPq, NSF,...

Unicamp start-ups: 358 companies, >19.000 jobs, yearly rev. R\$ 3 billion



BIOEN – FAPESP's Bioenergy research: 84 → 148 → 212 → 381 ton/Ha??

Review article

Sugarcane for bioenergy production: an assessment of yield and regulation of sucrose content

Alessandro J. Waclawovsky^{1,†,‡}, Paloma M. Sato^{1,‡}, Carolina G. Lembke¹, Paul H. Moore² and Glauca M. Souza^{1,*}

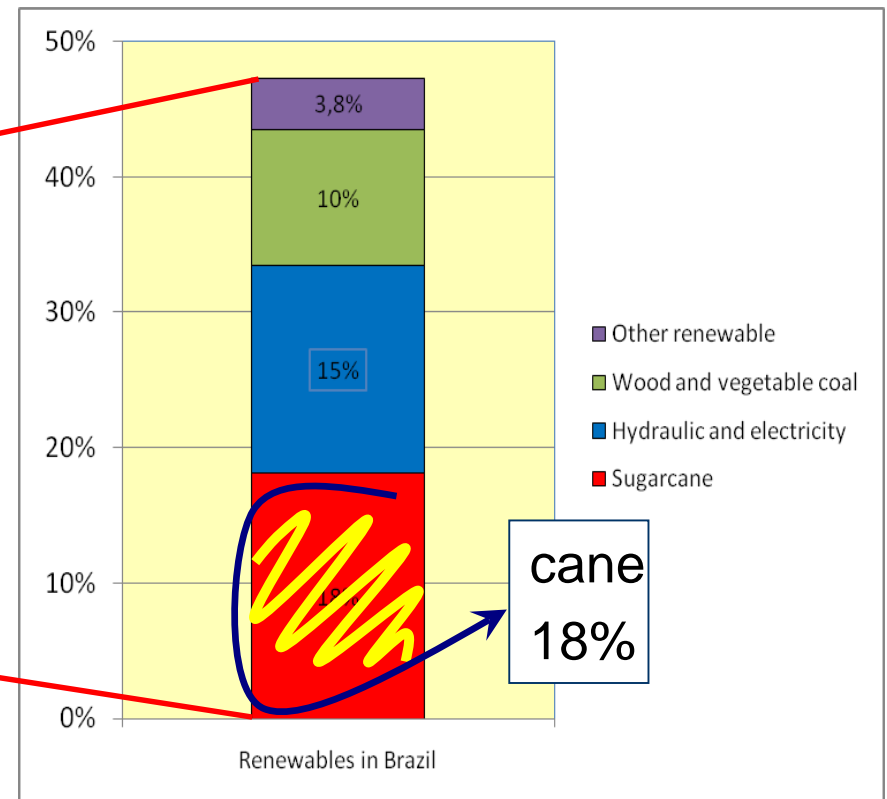
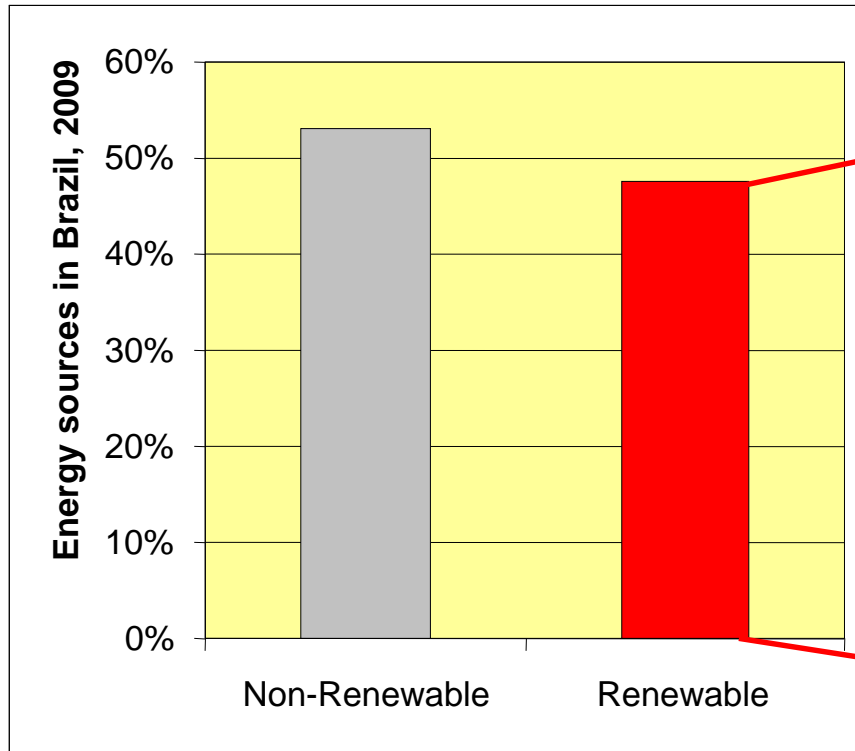
¹Departamento de Bioquímica, Instituto de Química, Av. Prof. Lineu Prestes, São Paulo, Brazil

²Hawaii Agriculture Research Center, Kunia, HI, USA

Table 1 Average, maximum and theoretical sugarcane yields (Australia, Colombia, and South Africa) and total dry matter production

Type of yield	Cane yield	Biomass*	
	t/(ha yr)	t/(ha yr)	g/(m ² d)
Commercial Average	84	39	10.7
Commercial maximum	148	69	18.8
Experimental maximum	212	98	27.0
Theoretical maximum	381	177	48.5

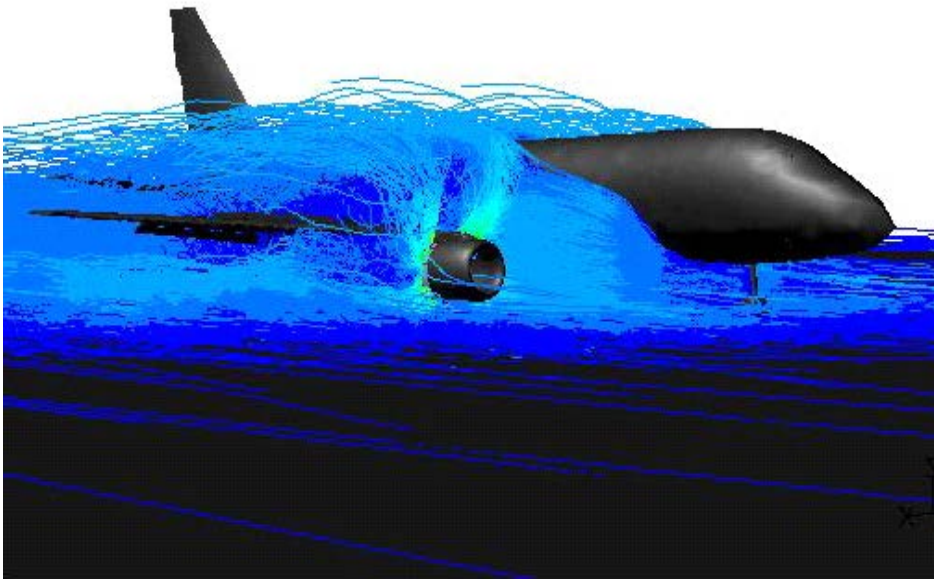
48% of Brazil's energy comes from renewable sources (2009)



Renewables in Brazil: 48%; World: 13%; OECD: 7,2%

Embraer-FAPESP: R&D to build an innovative jet

Computational Fluid Dynamics
(CFD) simulation and tests
Research co-funded by FAPESP,
using several universities



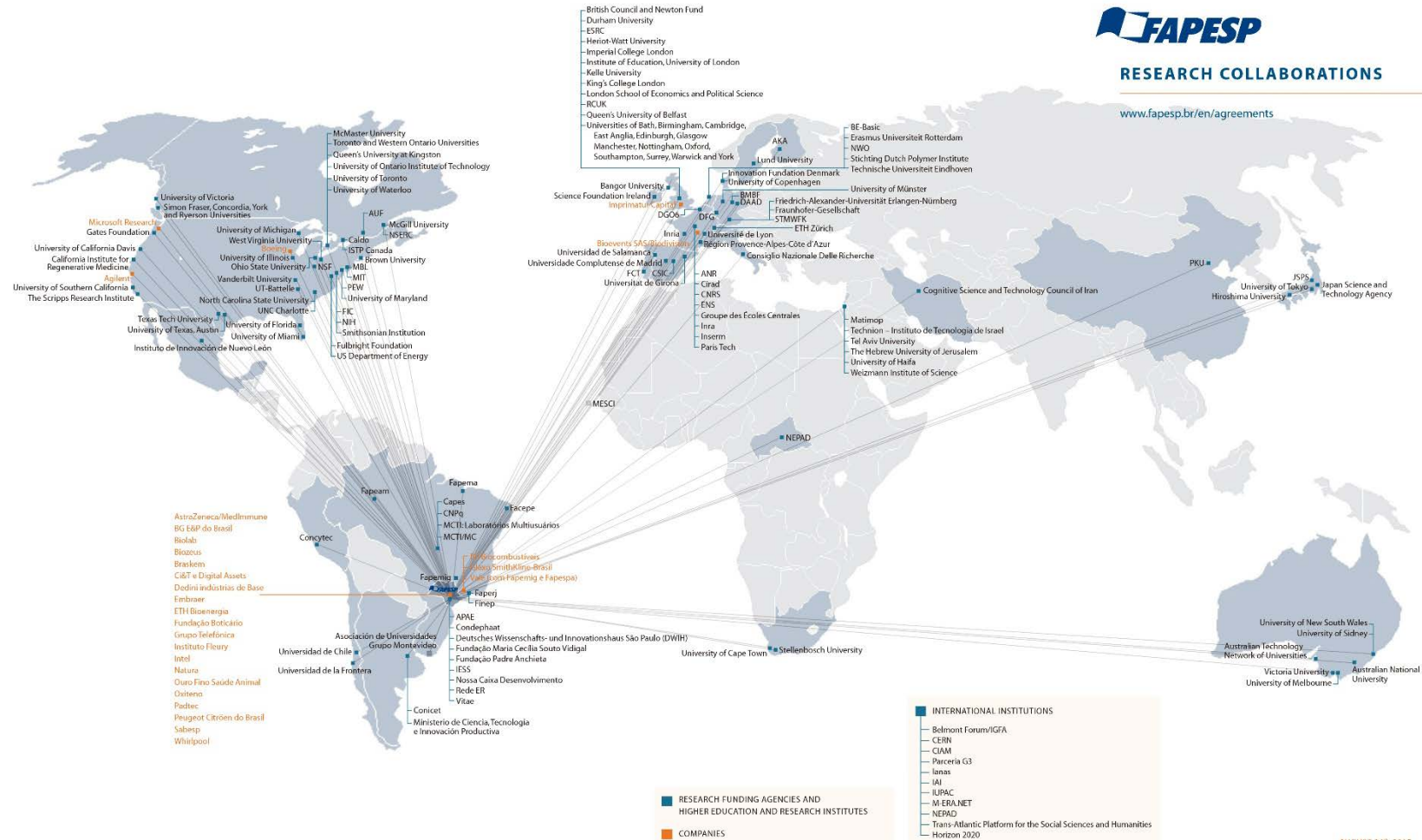
FAPESP-Industry-University Engineering Research Centers

- Center is hosted in a university, PI a professor
 - Adjunct Director is a researcher from the company as a visiting professor at the university
 - Other company researchers as visiting professor are more than welcome
- 10 year contract; R\$ 2 – 6 million per year from FAPESP and Company, plus labor costs by university
 - Typical proportion: FAPESP:Industry:University - 1:1:2
- One center selected, other five in selection
 - Peugeot-Citroen (PCBA)
 - Biofuel Engines Engineering Research Center; hosted at Unicamp (incl. ITA, USP, Mauá); PCBA+FAPESP - R\$ 16 million + in-kind by host univ. (est. R\$ 16 million)
 - GSK
 - Engineering Research Center on Sustainable Chemistry; R\$ 32 million + in-kind by host university
 - Engineering Research Center on Target Discovery; R\$ 32 million + in-kind by host university
 - Natura: Applied Research Center on Well-being and Human behavior
 - R\$ 20 million + in-kind by host university
 - BG: ERC Natural Gas

FAPESP: Basic Science Focus

- In the World and in Brazil there is in an “utilitarian” view about Science
 - Science that makes business more competitive
 - Science that heals the sick
 - Science that makes the poor rich
- In addition, FAPESP also values
 - Science that makes mankind wiser
 - In all fields there are fundamental questions
 - Philosophy, Archeology, Literature, Linguistics, High Energy Physics, Cosmic Rays, Astronomy, Evolution,..

FAPESP's research collaboration connections



AUGUST 24th, 2015



SPAnet

São Paulo Astronomy Network

São Paulo Astronomy Network

SPAnet

- An alliance of universities, institutions, and professionals, to boost the development of Astronomy and Astronomical Instrumentation research in the State of São Paulo.
 - Increase national and international visibility of São Paulo Astronomy,
 - Promote scientific education of our society and
 - Foster technological and economic contributions through a vigorous scientific instrumentation program.

<http://www.iag.usp.br/spanet/?q=en/home>



ASTRI MINI-ARRAY

Set of nine Cherenkov telescopes to capture gamma radiation of the universe, installed in the South Hemisphere.



LLAMA

12 meters diameter Radio telescope installed in the Argentine Andes to observe the millimeter and sub-millimeter wave Universe.



Giant Magellan Telescope

Super giant terrestrial telescope compound with 7 larger monolithic mirrors of the world, located in Chile.

SPANet Projects

- ASTRI MINI-ARRAY
- GMT - Giant Magellan Telescope
- LLAMA - Large Latin American Millimetric Array
 - Towards imaging the Event Horizon of a Black Hole (EHT)
 - Astrophysics with LLAMA through providing and integrating (band-9) receiver
- CTA - Cherenkov Telescope Array
- J-PAS – Javalambre – Physics of the Accelerating Universe
 - Stellar populations in the Milky Way
 - Project EMU: PAU – BRASIL
 - The 3-D Universe: Astrophysics with Large Galaxy Surveys
 - Study of star formation regions with J-PAS
- BINGO Telescope
- Gravitational Waves
 - Gravitational Wave Astronomy
 - Observatories For Gravitational Waves Astronomy
- High precision spectroscopy: impact in the study of planets, stars, the Galaxy and cosmology
- The study of the internal kinematics and of the stellar populations of nearby galaxies
- What Drives the Stellar Mass Growth of Early-Type Galaxies?
- CADA Project (Chemical Abundance Determinations in AGNs)
- HighPIDS - High Performance Intelligent Decision Systems for Solar Weather forecasting
- Constraints on the terminal ejection velocity fields of asteroid families
- SOUTH POL - Revealing the Polarized Southern Sky
- SPARC4 - Simultaneous Polarimeter And Rapid Camera in 4 bands
- Superdense Matter in the Universe

FAPESP international collaboration: bringing foreign scientists to SP

- Post doctoral fellowships (671 new awards in 2015)
 - Stipend, travel, some research money
- Young Investigator Awards (60 new awards in 2015)
 - Stipend, travel, full research support in a 4-year grant
- Visiting scientists
 - 275 in 2010 (travel, stipend; 2 weeks to 12 months)
- São Paulo Schools of Advanced Science (SPSAS)
 - Each one brings 50-100 young Dr students from abroad
- São Paulo Excellence Chairs (SPEC)
 - For senior level scientists from abroad: full research grant for staying 12 weeks per year in SP for 3-5 years

To know about research in São Paulo: FAPESP Newsletter – in English

- <http://agencia.fapesp.br/en/>

The screenshot displays the homepage of Agência FAPESP in English. The navigation bar includes the logo, 'NEWS', 'VIDEOS', and 'SUBSCRIBE' buttons, along with social media icons and a search function. The main content area features a large banner for 'Milky Way expanded from inside out' with a sub-headline: 'Study by team including Brazilian scientists published in *The Astrophysical Journal Letters* shows that formation of the galaxy's stars began in the center and then spread outwards.' Below the banner are several news snippets: 'Interview with Andre Geim | Nobel Prize in Physics 2010', 'Respirator mask reduces effects of pollution on the heart', 'Novel biomarker technique gauges field success of insect that parasitizes crop pests', 'Washington seminar scrutinizes reduction in Brazilian inequality', 'Dengue Zika Chikungunya', and 'Promising strategies to combat AIDS pandemic'. A 'SEE ALL NEWS' link is visible at the bottom of the news grid. The footer contains 'Agência FAPESP in social media' and 'Newsletter Agência FAPESP Sign up for the Agência FAPESP Newsletter. It's free.' The system tray at the bottom shows the date as 20:58 and the language as ENG.

