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1st LIA Meeting "Subatomic Physics: from Theory to Experiments"

Olivier Fudym

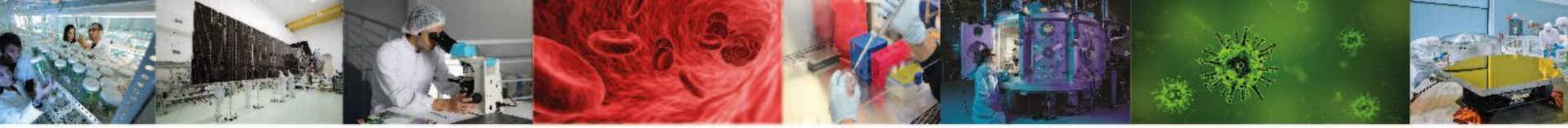
ITA, São José dos Campos, June 10, 2018

www.cnrsrio.org

Country	Papers	Citation impact	Institutions
USA	30,467	1.85	881
UK	11,668	2.66	187
France	10,615	2.43	279
Spain	10,105	2.39	266
Germany	9,957	2.54	185
Italy	7,826	2.73	225
Canada	6,884	2.77	87
Portugal	6,394	1.8	71
Australia	5,371	3.44	79
Netherlands	4,781	3.32	45
Argentina	4,763	2.03	45
Switzerland	4,339	3.53	44
China	4,260	3.68	315
Colombia	3,444	2.7	28
Mexico	3,324	2.97	67
Russia	3,257	3.93	132
Chile	3,143	2.34	52
Japan	3,076	3.92	225
India	3,065	4.36	212
Belgium	3,036	3.26	32

Figure 9 Top 20 countries that collaborate with Brazil 2011 – 2016 by number of papers.

Research in Brazil
A report for CAPES by Clarivate Analytics



CNRS ORGANISATIONAL DATA

www.cnrsrio.org

- Organization type: **scientific & technological** public organization, under administrative authority of the French Ministry of National Education, Higher Education and Research
- Creation: **1939**
- It is the largest fundamental research organization in Europe
- Research carried out in **all fields of knowledge**
- **Research performed in partnership** with universities and/or research organizations as well as private companies within **joint research units**
  - number of research units (laboratories): **1,100**
  - **95%** of research units are joint research units: **1,045**

RESOURCES AND RESULTS UP TO OBJECTIVES

- A **32 000** -strong workforce, including:
  - **11,100** researchers and
  - **13,500** engineers, technicians and administrative staff carrying out and supporting research

- 2014 initial budget: **3 309** billion euros, including **770** million euros in CNRS-generated income

- Over **1,100** research and service units

- **43,000** publications each year on average for the period 2007-2011, according to the Global Scimago Institutions Rankings 2015

- **21** Nobel prize laureates and **12** Fields Medal winners

AN IMPORTANT ACTOR IN ECONOMIC LIFE

The CNRS develops productive relationships with industry, helps laboratories enhance their research and transfers technology to the business world

- The CNRS has entered into **26** framework agreements with large industrial groups. It has set up **100** associated research laboratories with businesses, **21** Units.

- With a portfolio of **5629** patent families, the CNRS is among France's top **10** patent filers.

- More than **1,000** start-ups have been launched, stemming from research carried out in CNRS laboratories since 1999.

- The CNRS plays an active role in France's **14** technology transfer companies (SATT) and is a member of France's **46** competitiveness clusters (out of 70).

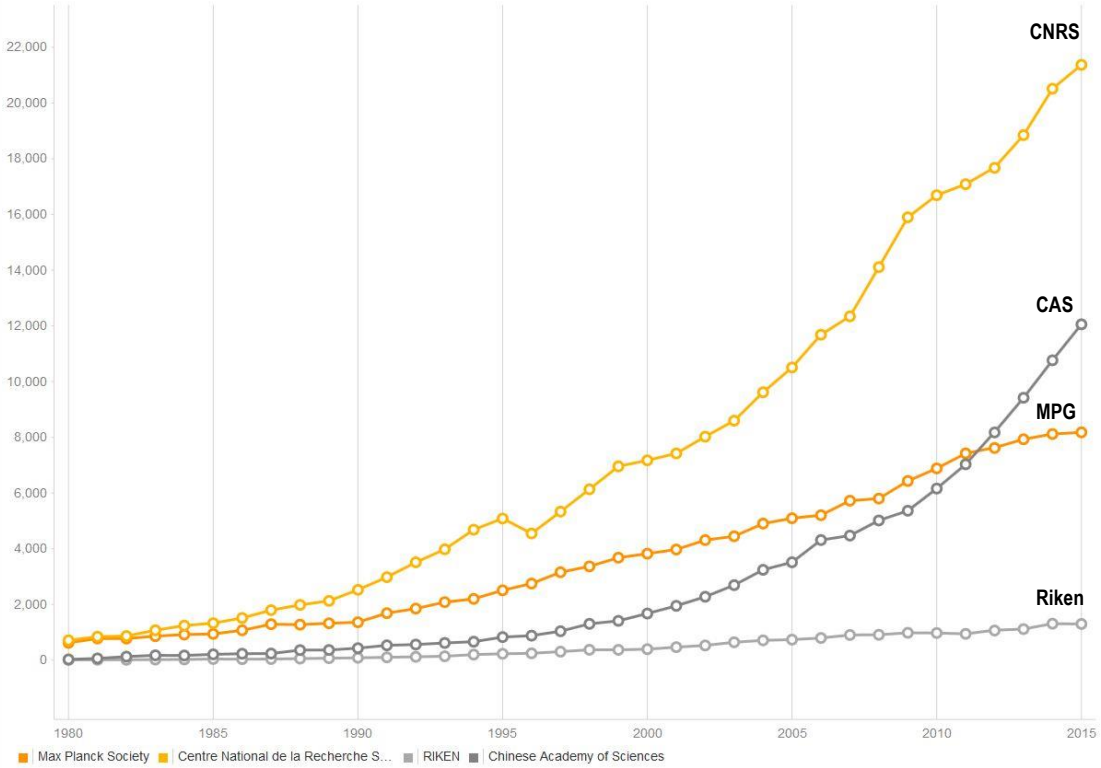
THE TEN CNRS INSTITUTES

www.cnrsrio.org

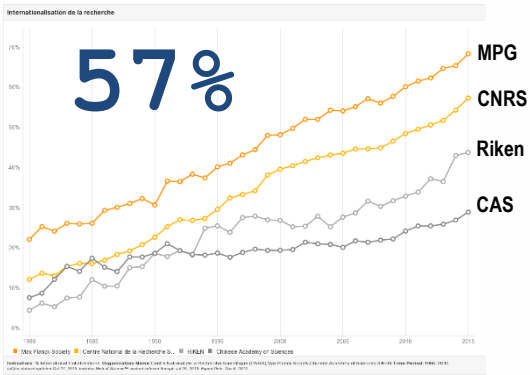
CNRS,
An international research key player

www.cnrsrio.org

CNRS International co-publications

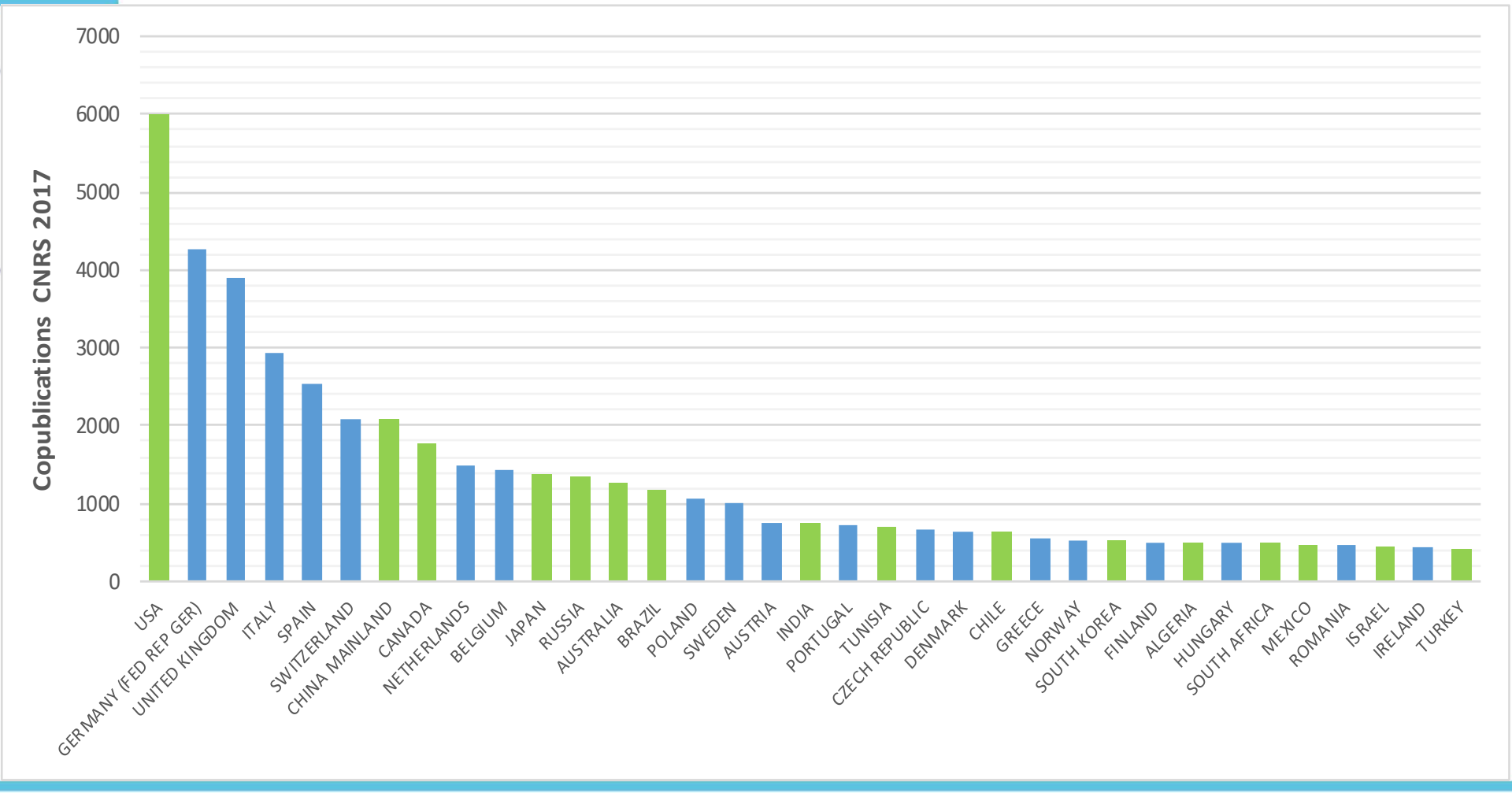


International Co-Publications rate

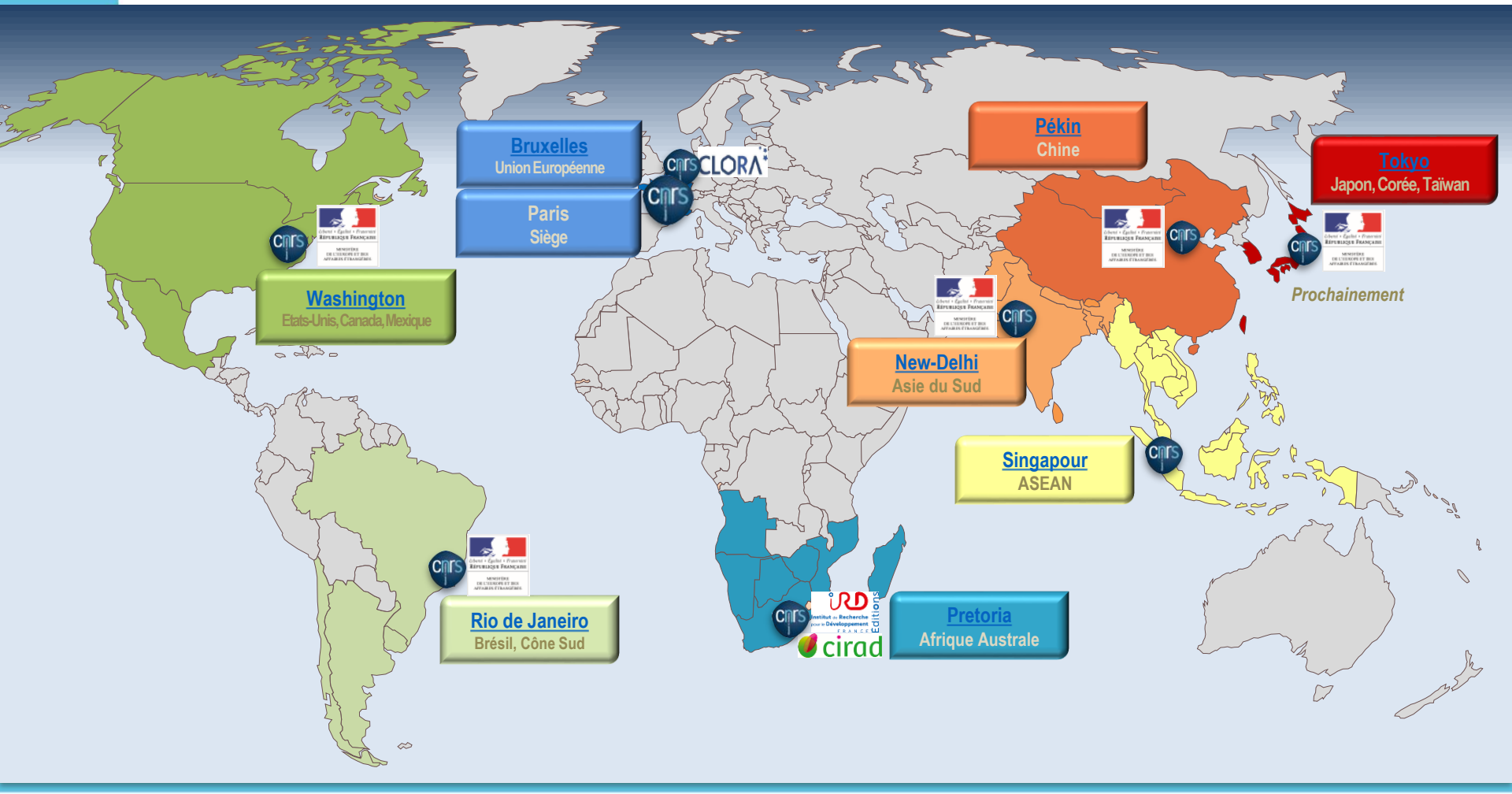


Clarivate Analytics

CNRS International Co-publications (2017)



CNRS Offices in the World



CNRS Office in Rio de Janeiro

Casa Europa

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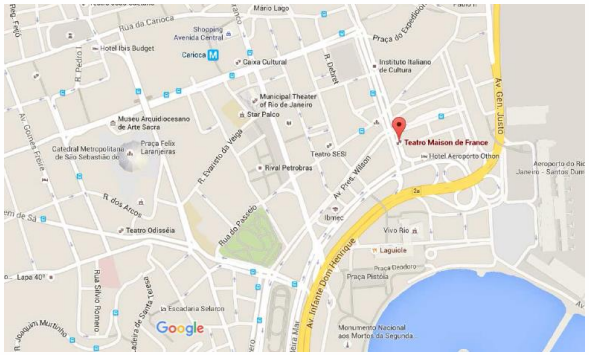
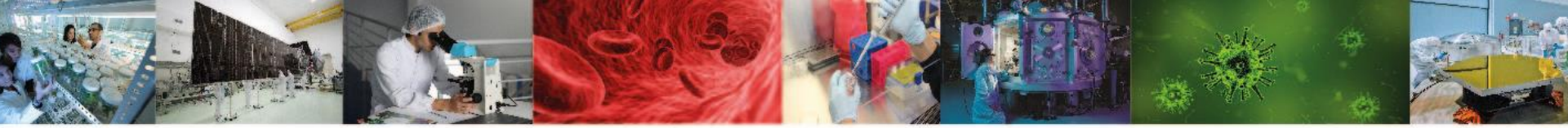


Julie Rochette

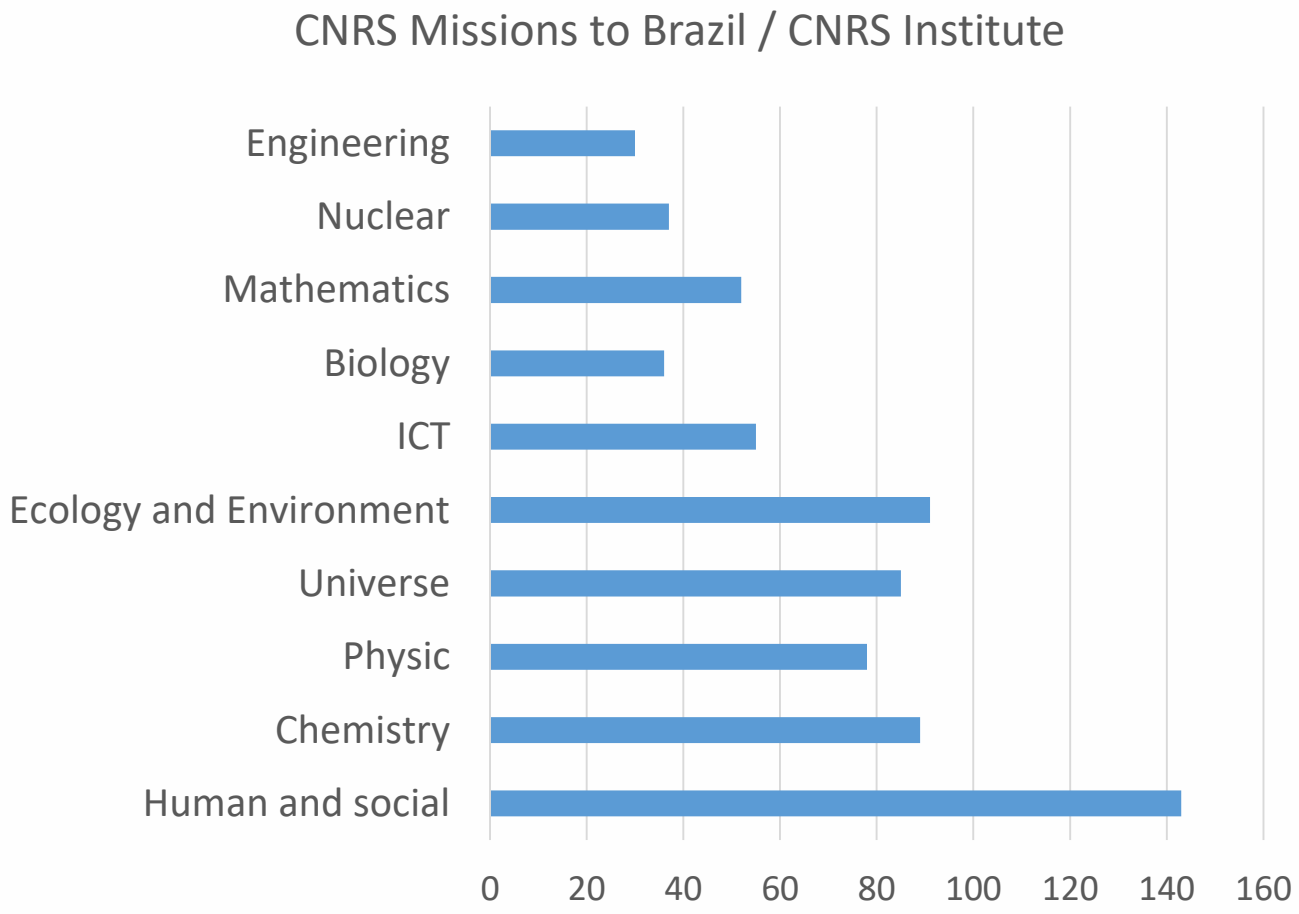
Alexandre Vila



Brief Focus on CNRS in Brazil

Number of Missions (2017)	**704**
Nb Missions < 10j	295
Nb Missions between 10 and 29 days	311
Nb Missions between 30 and 90 days	73
Nb Missions between 90 and 180 days	11
Nb Missions > 180 days	14
Average (days)	21
Total Homo-Sapiens Days	**10015**
Total FTE	**40**

CNRS Missions to Brazil in 2017



CNRS Projects in Brazil in 2018

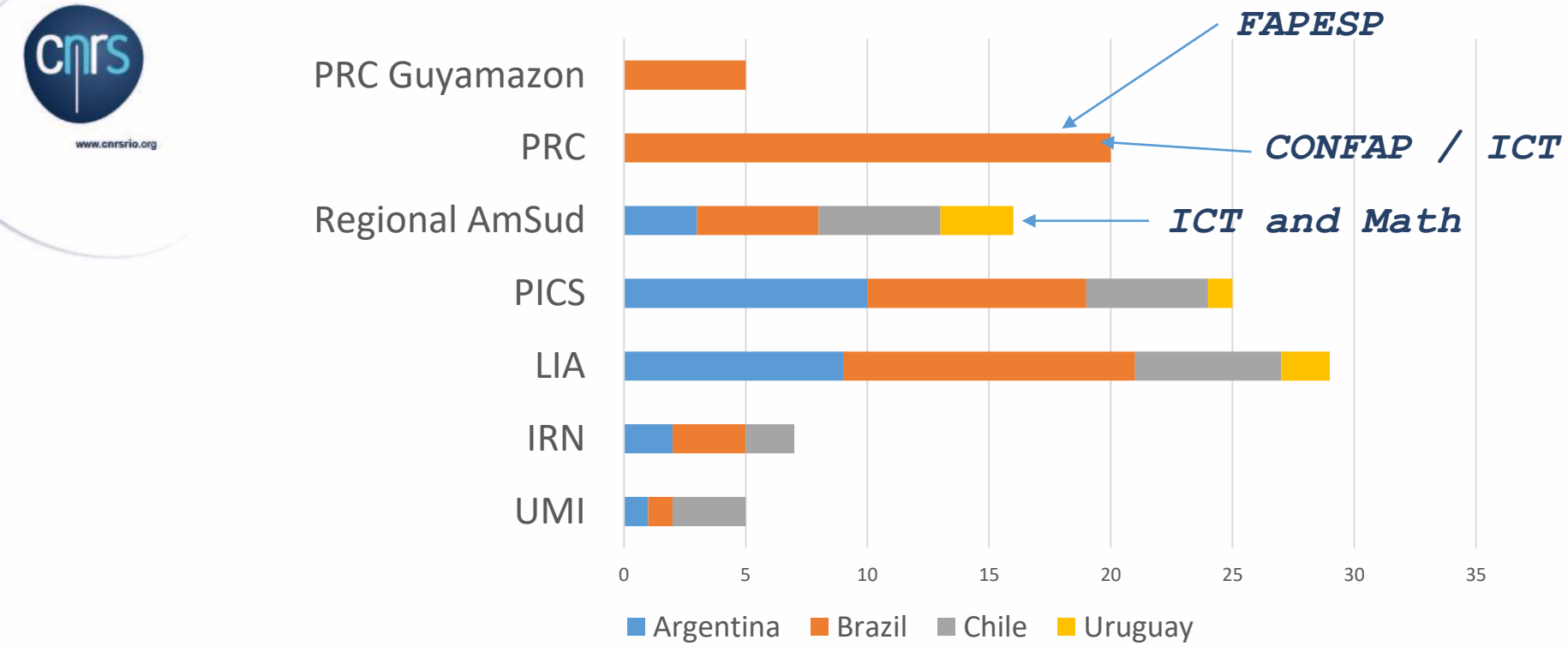
- 55 CNRS granted projects
- 4 bilateral programs (Calls)

Main Academic and research partners

Universidad Federal de Rio de Janeiro (UFRJ)	Ecologie, Biodiversité, microscopie et bioimagerie, biomatériaux	LIA MARRIO, LIA AEMB, IRN Web Science
Universidad de São Paulo (USP)	Electromagnétisme, Physique Subatomique	LIA Maxwell 2, LIA Subatomic Physics, LIA Lung Inflammation
Universidade Estadual de Campinas (Unicamp)	Biocombustibles, réseaux	LIA Energie et Environnement
Instituto de Matemática Pura e Aplicada (IMPA)	Mathématiques	UMI JC Yoccoz, IRN Réseau franco-brésilien de maths
Ministério da Ciência, Tecnologia, Inovações e Comunicações (MCTI)	Biologie, Bio-informatique, Physique	CNPEM/LNBIO, LNCC, IMPA, CBPF : LIA BACWALL, LIA LIRIO, LIA AEMB
Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)	Toutes disciplines	Co-évaluation des nouveaux LIA
Coordenação de Aperfeicoamento de Pessoal de Nível Superior (CAPES)	Toutes disciplines	Projets Régionaux STIC et MATH AmSud
Fundação Oswaldo Cruz (Fiocruz)	Sciences biologiques, Santé publique	Neurosciences

CNRS in Brazil and the South Cone

Brief Overview



105 CNRS founded Projects

CNRS in Brazil and the South Cone

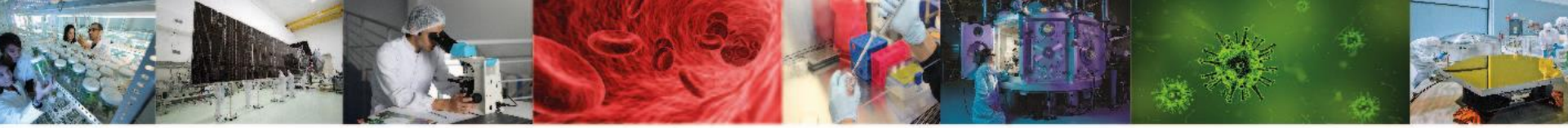
34 Joint Lab

5
Joint Units

29
International Associated Laboratories

7
International Research Networks

2
Human-Environment Observatories



LIA MARRIO

Patterns of sponge biodiversity and chemodiversity from Martinique to Rio de Janeiro

Joint Lab

Description

LIA MARRIO brings together French, Brazilian and Irish research teams to study the **biodiversity of sponges**. It works through the organization of many mobilities of researchers and students between France and Brazil, and common participation to sample acquisition campaigns, workshops or even thematic schools.

Project leaders

- Thierry Perez, Institut méditerranéen de biodiversité et d'écologie marine et continentale
- Michelle Klautau, Instituto de biologia da UFRJ

LIA MARRIO

Patterns of sponge biodiversity and chemodiversity from Martinique to Rio de Janeiro

Objectives

The scientific objectives of LIA MARRIO are:

- **apply Integrative Taxonomy** for a better understanding of the mechanisms at the origin of sponge biodiversity;
- **study sponge populations**, their phenology and their metabolomic variability in a changing environmental context;
- **develop metabolomics** for issues of marine chemical ecology and sustainable valorization of chemodiversity.

LIA LIRIO

Laboratory InteRnational of research in bIOformatics

Joint Lab

Description

I Two major axes of research are covered by the LIA, each one concerned with the more general **study of the interactions, in particular symbiotic, between different organisms, and of those organisms with their environment.** Such interactions are investigated using both an experimental and a computational approach. Experiments include in vivo manipulations and sequencing, while the methodological part includes bioinformatics (sequencing data treatment and analysis) theoretical computer science and mathematics (modelling, algorithmics, statistics and combinatorics).

Two laboratories involved

I Laboratoire de Biométrie et Biologie Évolutive, LBBE, Lyon
(project leader: Marie-France Sagot)

I Laboratório de Bioinformática, Laboratório Nacional de Computação Científica, Petrópolis
(project leader: Ana Tereza Ribeiro de Vasconcelos)

LIA PALMHEAT

Global change and food security

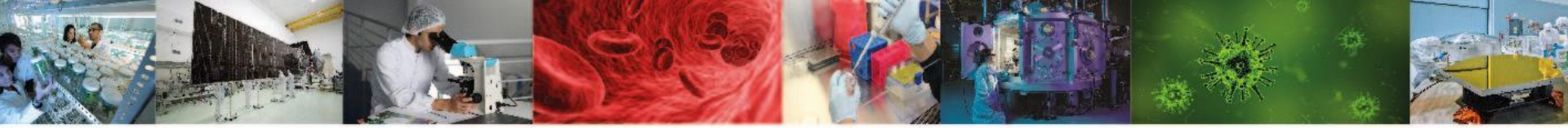
Joint Lab

Description

Intense episodes of acute heat and drought are predicted on a global scale, presenting a serious threat to food security. The focus of the project is to **identify new genetic resources and molecular mechanisms implicated in resistance to heat stress, in order to ultimately produce crops with increased productivity in the era of global change and climate instability**, just like another « Green Revolution »

Two laboratories involved

- Institut de Biologie Moléculaire des Plantes (IBMP), Strasbourg (project leader: Hubert Schaller)
- Laboratório de Biotecnologia Vegetal (LBV), Belém (project leader: Sylvain Darnet)



UMI EBEA

Evolutionary Biology and Ecology of Algae

Joint Lab

www.cnrsrio.org

Description

French-Chilean lab created in 2014. The goal of the unit is to **develop research on the dynamics of biodiversity of marine micro and macroalgae**, characterized by complex life cycles and often living in contrasted habitats.

The UMI research project is structured in **three main research axes**:

- 1) Evolution of sexual reproduction and its consequences
- 2) Understanding speciation processes and the evolutionary and ecological limits of adaptation
- 3) Public policy support for societal issues involving the conservation of biodiversity from anthropic pressures: domestication and cultivation, management of genetic resources and global change

Director of the UMI : Myriam Valero
Deputy Director: Sylvain Faugeron

Three laboratories involved

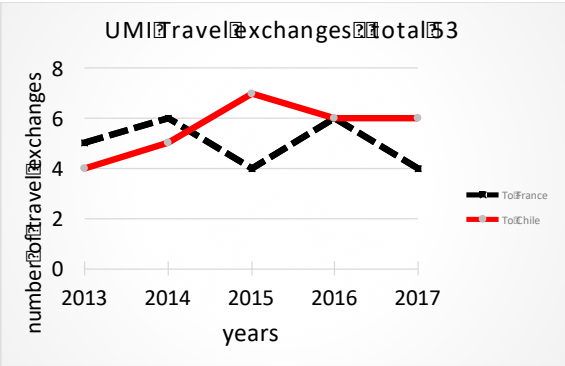
CNRS UPMC
Station Biologique
Roscoff

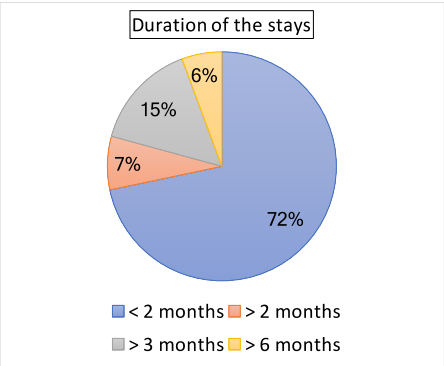
Station Biologique de Roscoff, France

Facultad de Ciencias Biológicas, Pontificia Universidad Católica de Chile

Instituto de Ciencias Ambientales y Evolutivas, Universidad Austral de Chile

Scientific exchanges between France and Chile





Numerous scientific exchanges:

53 since 2013: about 10 per years in both directions

Mainly short visits but more than 25% for more than 2 months

(Master and PhD students, Researchers and technicians)

Publications

Total 89 publications, 72 since 2014 Synergistic effect of the UMI (4.73 publications per year and per ETP)

« Raison d'être » of the UMI

Promoting international Franco-Chilean collaboration (and more generally towards Latin Amica: IRN Debma):

- On basic research in Ecology and Evolution by a complementary of approaches on relatively little studied organisms (mainly micro- and macroalgae) that nonetheless have particularly interesting features, such as a wide variety of life cycles and mating systems.
- To bridge the gap between basic research and societal issues (seaweed cultivation and management or conservation of marine resources)
- On training actions: student exchanges and summer school
- To reinforce the strenght of the population genetics school in Chile and the strenght of research in seaweed in Roscoff at the international
- **The UMI was involved in the organization of the two France-Chile Forums, where was presented its experience to other collaborative but less consolidate initiatives**

OHM Bahia Exploradores

Human-Environment Observatory in Patagonia

Description

- The OHM Bahia Exploradores was **created in March 2016** by the Institute of Ecology and Environment (INEE) of the CNRS jointly with the Pontifical Catholic University of Chile.

- The objective and the scientific perspectives of the observatory, aim on the one hand to the **acquisition of knowledge on the area of Bahia Exploradores** and its area of influence and on the other hand to **contribute to the decision support in terms of conservation and sustainable development in a context of territorial change** in close coordination with national institutional actors and the local socio-economic fabric (industry, tourism, livestock farmers),

Location

About 300 km to the south of the city of Coyhaique, Bahia Exploradores station is located at the mouth of the Exploradores River and the Pacific fjords away from any urban settlement: the first village of Puerto Rio Tranquilo is installed on the shores of the Lake General Carrera, 80 km to the east.

The Bahia Exploradores sector offers privileged conditions to **study the impact of climate change (glacier retreat, erosion, fluvio-glacial dynamics) and biodiversity**, but this terrain also offers an interesting opportunity to **observe the impacts and transformations generated by an ongoing humanization process.**

Main topics of research

The research carried out by ecologists, biologists, geographers, agronomists and architects ... is organized around four major themes structured according to a **global and interdisciplinary approach** articulating retro-observation / observation-instrumentation / modeling-simulation:

- **Territorial dynamics of socio-ecological systems**: history of the environment and historical ecology, land use - land use dynamics and environmental impacts, sustainable tourism, economic activities and human pressure, historical geography and territorial governance.

- **Impact of climate change and biodiversity dynamics in a context of rapid change**: ecology of marine and terrestrial environments, renewable natural resources, climate and glacial dynamics, erosions and risks, palaeoecology-palaeoclimatology, biological invasions, etc.

- **Productive activities and contaminations**: biogeochemistry, ecotoxicology (impact of salmon farms), atmospheric deposition.

- **Sustainable development in extreme environments**: habitats, energy, tourism, environmental education, heritage.

SticAmsud BRILAM

Bioacoustical Research in Latin America

Description

- **Bioacoustical study of whale and dolphins vocalizations** to **reconstruct the animal's position** exploring all the information inside the vocalization signal.
- **Bioacoustical study of bird songs** to **identify a particular bird specimen** in a recording of it, and to **recognize all specimens singing** in a long sequence (up to one hour) of raw soundscapes that can contain tens **of birds singing simultaneously.**

Institutions involved

LIS CNRS, France

Univ Concepcion, Chili

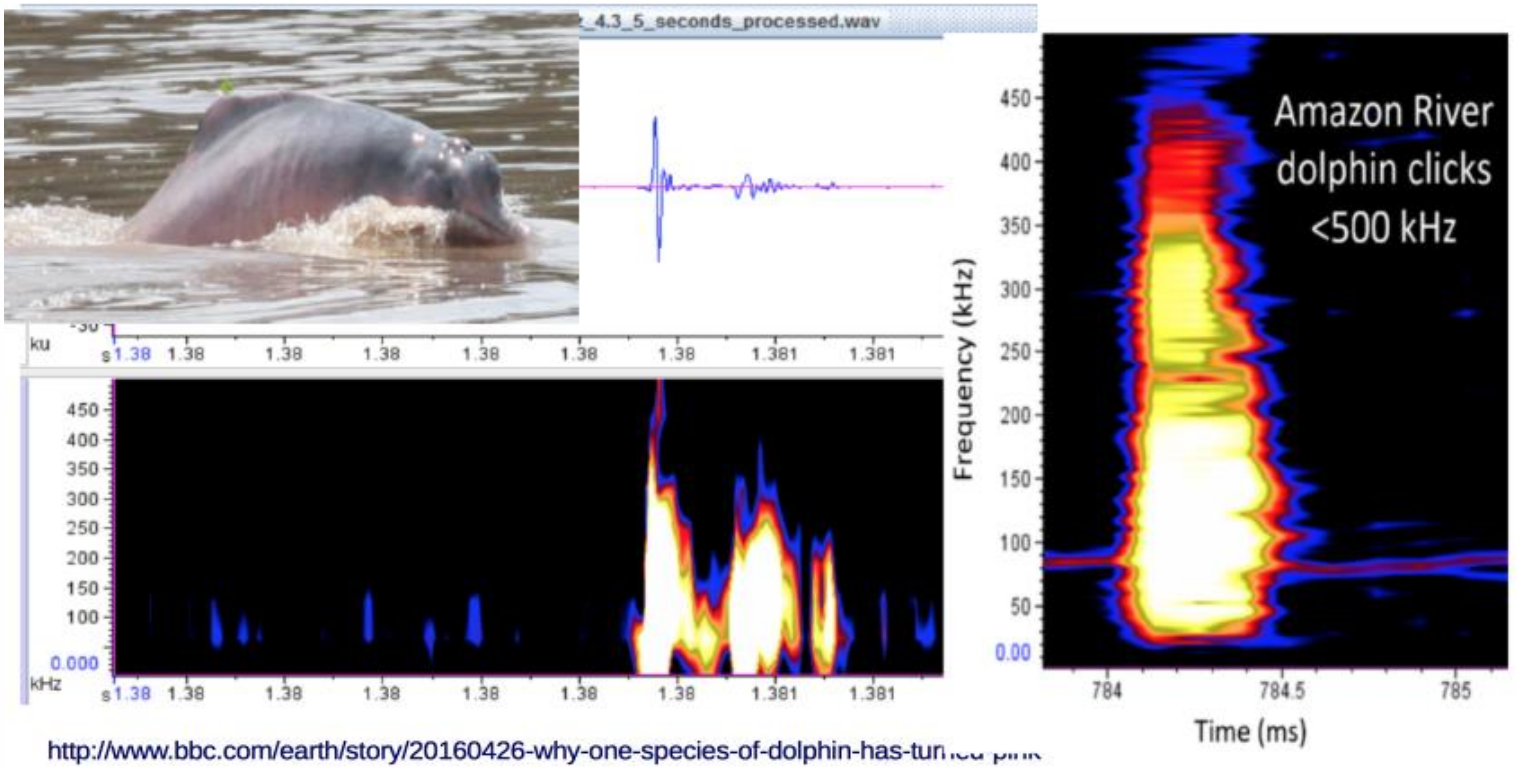
Conapac, Peru

Project leaders

- Hervé Glotin
- Susannah Buchan
- Elwin van 't Wout

Experience on a dolphin named Jason

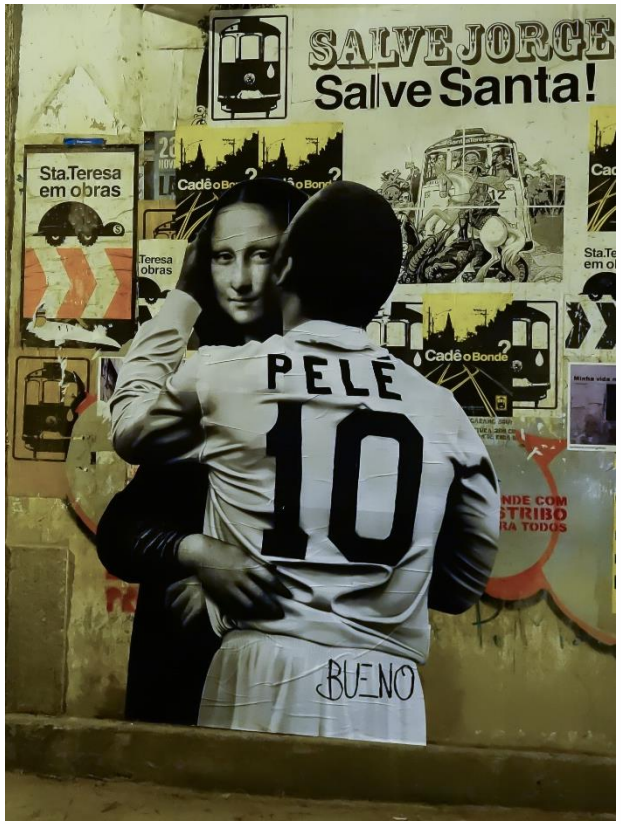
Jason reveals ultra high frequency *Inia* g. biosonar...



http://www.bbc.com/earth/story/20160426-why-one-species-of-dolphin-has-tur

Some conclusions

- A very mature, dense and long history collaboration
- Large spectrum of topics
- Many domains involved
- Ready to adress transverse and Regional scientific challenges



Merci !

Obrigado !

Gracias!

Thank you !