

# IRD-CNRS-CIRAD Joint Office in Southern Africa

## focus on environmental issues

**SAEON Seminar Series**

**November 7th**

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# Who we are ?



« French research Institute for sustainable development »

→ *Multidisciplinary, Global South, SDG's*

→ *South Africa, Mozambique, Zambia, Zimbabwe*



« National Centre for Scientific Research »

→ Largest institute in EU

→ *All fields of research, 2<sup>nd</sup> publisher of science in the World*

→ *Angola, Botswana, Comoros, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Zambia, Zimbabwe*



« French Agricultural Research Centre for International development »

→ Agriculture for development

→ *South Africa*

# A joint office unique in the world



## Inform

on SA Higher Education, Research & Innovation ecosystem  
on IRD/CNRS/Cirad tools and teams

## Promote

and showcase these scientific collaborations

## Connect

the most relevant interlocutors within  
French/SA labs

**10 Staffs**

## Help

SA & French researchers in their will to  
structure and boost their collaborations

**314 short scientific stays  
(2023)**

**< 8000 days**

# A wide range of Thematics and Tools for partnership



- IEA: International Emerging Action → : **Psychology/youth**
- JRP: Joint Research Prog → : **Geology; Social sciences (abortion)**
- RRS: Residential research School → : **Physics**
- IRN: Int. Research Network → : **Physics; Geometry; Maths; Social sciences; Rock Art**
- IRP: Int. Research Projects → : **Ocean communication; Geology; Atmospheric research; Ethology**
- IRL (ex-UMI): Int. Research Labs → : **Eco/environment ; Social sciences (IFAS, Joburg)**



- ARTS: Travel & stay in France for PhD → : **Tuberculosis**
- IRN: Int. Research Network → : **Plastic ; Ocean Modelisation ; Aquaculture ; Digital - urbanization**
- LMI : Int. Joint Lab. → : **Aquaculture**



- RP: Platforms in Partnership for research and Training → : **Governance - agriculture**

# Natural and human environmental issues : some projects

- Aquaculture and nutrition
- Ecology and environment
- Zoonosis : Environment and diseases
  - Archeology & paleontology
  - Agriculture & governance

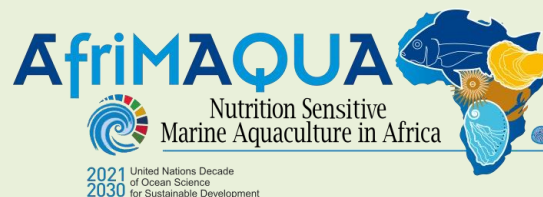
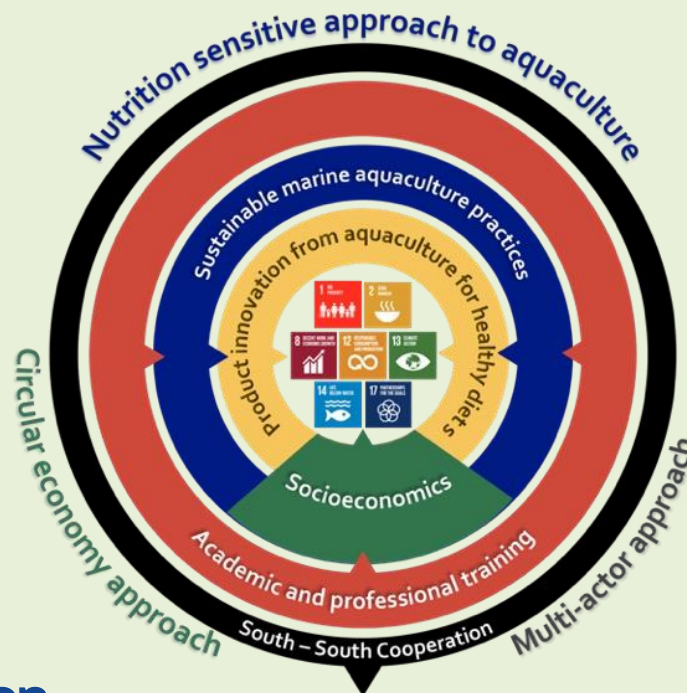
# Aquaculture and nutrition

# LIMAQUA

African interdisciplinary laboratory  
in sustainable nutrition-sensitive  
marine aquaculture



Interdisciplinary research and training programme to tackle nutritional and sustainability challenges of marine aquaculture to contribute to nutrition security, poverty alleviation, and income creation



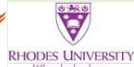
**Objective 1:** To develop sustainable marine aquaculture practices for target species

**Objective 2:** To develop an integrated approach to marine aquaculture development

**Objective 3:** To develop aquaculture-based food and nutritional products

**Objective 4:** To provide capacity-building & training in each discipline and in interdisciplinary research

**Objective 5:** To promote South-South cooperation within Africa









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# Ecology and environment



Life sciences, environmental sciences

# Reconciling Ecological and Human Adaptations for a Biosphere-based Sustainability

CNRS [International Research Laboratory REHABS](#) (created 2019, renewed 2024)



A hub for innovative research on **social-ecological systems and biosphere-based sustainability** for the Anthropocene

3 CNRS scientists assigned since 2021

1 CNRS Contract, and 1 visiting scientist/year

- ✓ EU ProSuLi (2018-21)
- ✓ HUM-ANI (BNP-Paribas, 2021-23)
- ✓ ISANGO (MEAE 2023-2024)
- ✓ Table Mountain Fund (2024-2026)
- ✓ French ANR

✓ MSc & PhD supervision, lectures at NMU



2011 with ZA Hwange  
2015 with NMU



Researchers

France: >4 FTE  
RSA: 4 FTE



NMU Postgraduate  
students 15/year



Partners

Nelson Mandela University  
CNRS  
University of Lyon  
(Ass.: Univ. Angers,  
SANParks)



CNRS, Univ.  
Lyon, NMU, EU,  
NRF, ANR,  
MEAE

## Garden route, Kruger Park : a wide range of collaborations

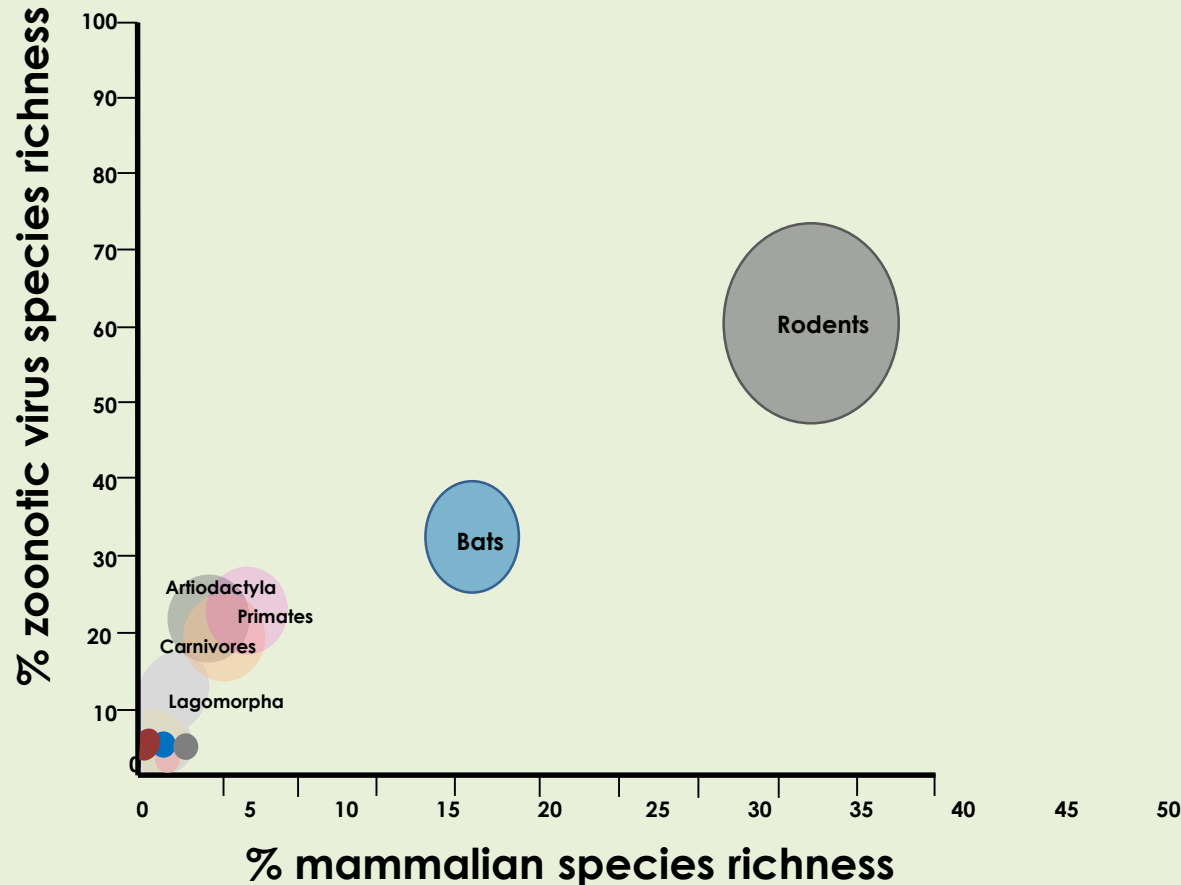
- The IRL consortium needs to continue being a key actor in developing the long-term observation infrastructure (EFTEON) in the **Garden Route** Landscape in partnership with SAEON
- a collaboration between USA-based universities, SAEON, and SANParks, developed in **Kruger National Park** and funded by the National Science Foundation (NSF)

# Environment and diseases



# Victoria project

*Viral circulation and sharing in bat and rodent species living at the interface with humans and potentials risks of zoonotic spillover in southern Africa.*



The specific aims of this project are to study the circulation and transmission of 3 viral families, Astroviruses, Coronaviruses and Paramyxoviruses in bat and rodent species, and in human populations living in close contact with these animals.

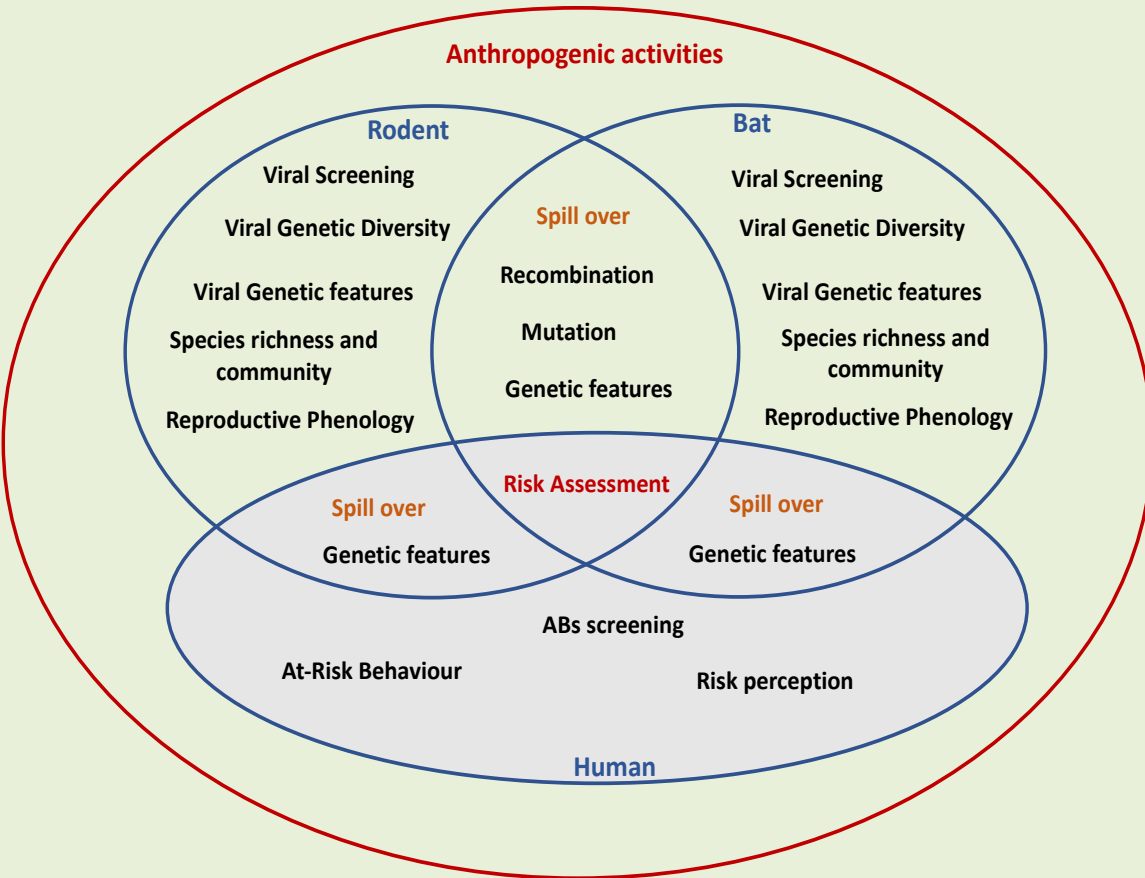


# Victoria Project

## Longitudinal study

Bats = 1000 samples/site

Rodents = 600 samples/sites



## One Health approach

### WP-1

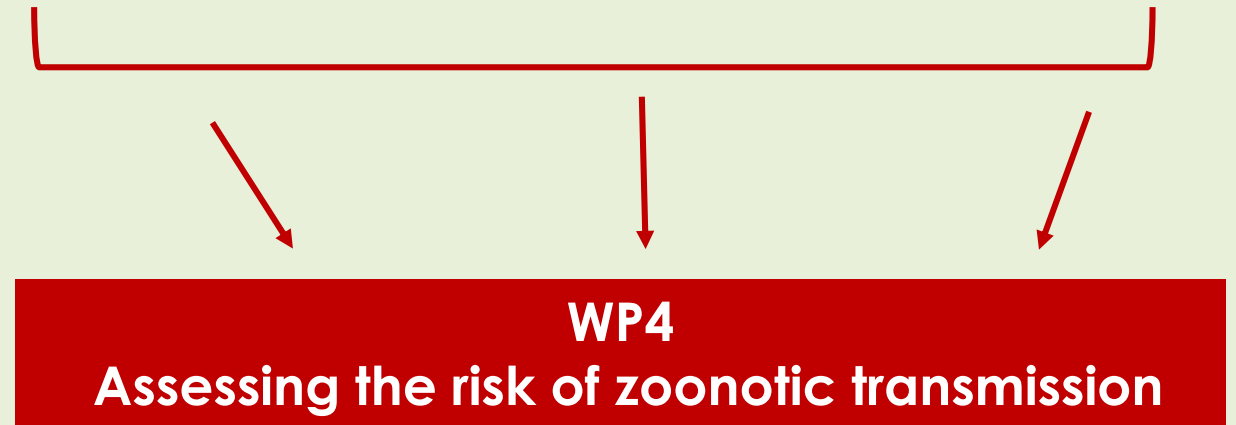
Longitudinal monitoring of bat and rodent communities

### WP-2

Detection and characterisation of potentially zoonotic viruses in bats and rodents

### WP-3

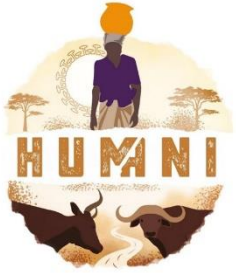
Characterisation of human exposure and community perception of zoonotic risks







# HUMANI Project



Increasing infectious diseases' threats and multi-hosts transmission in a context of climate change and biodiversity erosion



Imperial College  
London



DEPARTMENT OF  
STATISTICS



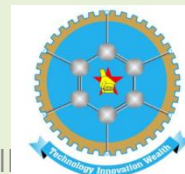
Deploying research  
Sharing science  
Transforming the future



NELSON MANDELA  
UNIVERSITY



JOINT OFFICE II



ad



AGRICULTURAL RESEARCH  
FOR DEVELOPMENT





# Archeology and Paleontology

## LETTER

doi:10.1038/nature14268

### New cosmogenic burial ages for Sterkfontein Member 2 *Australopithecus* and Member 5 Oldowan

Darryl E. Granger<sup>1</sup>, Ryan J. Gibbon<sup>2</sup>, Kathleen Kuman<sup>3,4</sup>, Ronald J. Clarke<sup>3</sup>, Laurent Bruxelles<sup>4,5,6</sup> & Marc W. Caffee<sup>1,7</sup>

The cave infills at Sterkfontein contain one of the richest assemblages of *Australopithecus* fossils in the world, including the nearly complete skeleton StW 573 (‘Little Foot’)<sup>1–4</sup> in its lower section, as well as early stone tools<sup>5–7</sup> in higher sections. However, the chronology of the site remains controversial<sup>8–14</sup> owing to the complex history of cave infilling. Much of the existing chronology based on uranium–lead dating<sup>10,11</sup> and palaeomagnetic stratigraphy<sup>8,12</sup> has recently been called into question by the recognition that dated flowstones fill cavities formed within previously cemented breccias and therefore do not form a stratigraphic sequence<sup>4,14</sup>. Earlier dating with cosmogenic nuclides<sup>9</sup> suffered a high degree of uncertainty and has been questioned on grounds of sediment reworking<sup>10,11,13</sup>. Here we use isochron burial dating with cosmogenic aluminium-26 and beryllium-10 to show that the breccia containing StW 573 did not undergo significant reworking, and that it was deposited  $3.67 \pm 0.16$  million years ago, far earlier than the 2.2 million year flowstones found within it<sup>10,11</sup>. The skeleton is thus coeval with early *Australopithecus afarensis* in eastern Africa<sup>15,16</sup>. We also date the earliest stone tools at Sterkfontein to  $2.18 \pm 0.21$  million years ago, placing them in the

traditional sense to include humans and their ancestral relatives but exclude the great apes.)

Dating of Member 2 and StW 573 has been problematic. Flowstones in the vicinity of StW 573 date to about 2.2 million years (Myr)<sup>10,11</sup>, but they post-date the breccia and the fossil<sup>4,14</sup>. The only previous date on the breccia itself was cosmogenic <sup>26</sup>Al/<sup>10</sup>Be burial dating of fine-grained quartz<sup>9</sup>, which yielded a best-fit age of  $4.17 \pm 0.35$  Myr. This age has been questioned by many<sup>10–13,24</sup> who have suggested that fine sediment could have been reworked from older, higher deposits within the cave, making the burial age of the sediment older than the fossil. To resolve the age of the fossil the breccia must be dated and it must be shown to be a coherent stratigraphic unit, largely free of reworked material. This is now possible owing to improvements in measurement precision and new techniques such as isochron burial dating which can explicitly validate the coeval deposition of the entire unit<sup>24–27</sup>.

Member 5 contains both *Homo ergaster* and *Paranthropus* fossils as well as Oldowan and Acheulean stone tools<sup>5–7</sup>. Member 5 East is divided into a lower Oldowan infill, with the first appearance of stone tools and a few fossils of *Paranthropus*, and an overlying early Acheulean infill<sup>5–7</sup>.



@ Patrick Landman & Remi Benali



# Archeology : Bolt Farm's Project

Evolution of Palaeobiodiversity and Palaeoenvironments In Southern Africa during the Plio-Pleistocene



**Fossiliferous area of Bolt's Farm  
(Cradle o Humankind)  
Sites dated between 4.5 and 0.9 Ma ago**

## Geological time + Climatic changes

- Component of biodiversity (resilience, adaptation, extinction)
- Migration to or from East Africa versus isolated from the rest of Africa (refuge, local evolution).



**FOSSILS**



**Excavations**



**Between 3 & 2.6 Ma**



**Between 2 & 1.8 Ma**

**Reconstructions of palaeoenvironment at Bolt's Farm**

PESA (1996-1999)  
Palaeontology Expedition  
to South Africa



**Prospectio  
ns**

**2011**

**Excavations**



HOPE (2001-2003)  
Human Origins  
and Past Environments

2006-2007 PAI PROTEA  
France-South Africa  
(Palaeoanthropology and  
palaeoenvironmental studies in  
South Africa)

2011-2014 & 2015-2018  
LIA 'HOMEN' CNRS-NRF  
(Hominids and Environments:  
Evolution of Plio-Pleistocene  
Biodiversity (Cradle of  
Humankind, South Africa)

2019-2023  
IRL 'HOMEN' CNRS-NRF  
(Hominids and Environments:  
Evolution of Plio-Pleistocene  
Biodiversity (Cradle of  
Humankind, South Africa)

2008-2010 PICS  
CNRS-NRF  
(Plio-Pleistocene hominids and  
palaeoenvironments of the  
Cradle of Humankind (South  
Africa) )

2015-2018/2019-2022/2023-2026  
MPFSA  
(Mission Paléoanthropologique Franco-Sud-Africaine)

2024-2025  
PHC PROTEA  
MEAE/MESRI-NRF



**PERMITS**

**2009**

J. F. Thackeray

S. Potze  
& D. Gommery

**2017**

D. Gommery,  
L. Kgasi  
& J. Brink

**2020**

D. Gommery,  
L. Kgasi  
& N. Vilakazi

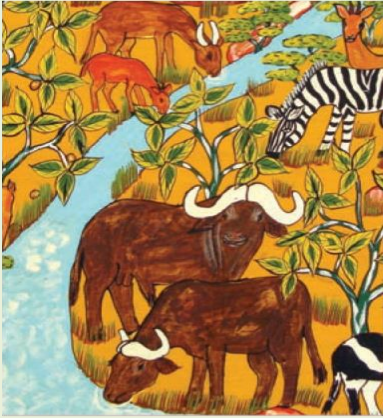




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# Agriculture & governance

# Ecology, agriculture : a multidisciplinary platform




## Production and Conservation in Partnership

Applied research,  
post-graduate training and expertise  
on human-nature interactions  
in the periphery of protected areas:  
supporting the co-existence of  
agriculture and conservation  
in Southern Africa.

- European Commission (EU)
- Food and Agriculture Organisation (Fao)
- french ministry of foreign affairs (MAEE)
- french national agency for research (ANR)
- french agency for development (AFD)

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RÉPUBLIQUE  
FRANÇAISE  
*Liberté  
Égalité  
Fraternité*



Lower Zambezi  
Mana TFCA



Kavango-Zambezi  
TFCA

Great Limpopo TFCA



www.rp-pcp.org





## Who we are:

The research platform “Production and conservation in partnership” (RP-PCP) was established in 2007, formally associating

- University of Zimbabwe
- National University of Science and Technology
- Cirad
- CNRS

since the 5 other Zimbabwean Universities, 1 French research institute and 4 regional universities have joined the platform.

Beginning in 2016, the staff involved in the activities of the RP-PCP represented an international multidisciplinary group of more than 100 senior researchers, academics and post graduate students from a wide range of disciplines, including social sciences, agronomy, ecology, geography and veterinary sciences



## Our objectives:

The overall objective of the RP-PCP is to:

“Contribute to sustainable development, biodiversity conservation and improved rural livelihoods in southern Africa” through strengthening national research capacities, multidisciplinary approaches and institutional partnerships with a focus on protected areas and neighbouring production areas.

Our multidisciplinary group is organized in four broad thematic areas:

- Health, Animals and Environment
- Ecology and Sustainability
- Agriculture and Conservation
- Natural resources Governance, Institutions and Policy

The RP-PCP seeks to promote applied research on “wild-domestic interfaces” in order to address issues related to the coexistence of man and nature. Recently the platform started collaborating regionally with research institutions in Botswana, Mozambique, South Africa and Zambia to address similar issues across TFCAs.

## Key achievements

Since its inception, as a research platform, the RP-PCP aims at promoting applied scientific studies through support to post graduate students, the vast majority of them being Zimbabwean.

So far 148 post graduate students (Msc, Mphil, Ph.D) have been/ still are supervised under the RP-PCP, including 95 Zimbabweans, 18 SADC and 39 European students.

Altogether they have produced:

- Over 180 research articles and books
- more than 100 communications and posters presentations during regional and international conferences.



Recycled paper - Certifié PEFC



Editin and Layout: C. Rollin  
Cirad 2016

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**Some tools for these researchs**





# Collaboration tools

## Exploring

International Emerging Actions

2-year PI-to-PI research projects

10 000 - 14 000 €/year

Seed funding

## Consolidating

International Research Networks

5-year multi-team scientific coordination networks

50 000 - 75 000 €/year

International Research Projects

5-year labs-to-labs collaborative research projects

50 000 - 75 000 €/year

Strengthening a collaboration on the mid-to long term

## Structuring

International Research Laboratories

5-year joint research laboratories with a physical presence

100 000 - 150 000 €/year

Highlighting iconic operations and implementing a strongly localized international presence

## Integrating

International Research Centres

Wide range of cooperation projects

Joint institutional steering

Bottom-up approach

Laboratory approach

Institutional approach



# International collaboration tools

## JRP

Joint Research Programmes

Encourage research and **capacity-building** by reinforcing existing collaborative activities

### 4 years, 300k€

- ✓ 180k€ for mobilities, equipment and the organization of 2 scientific events (research school, symposium)
- ✓ 120k€ for a 3 years **doctoral contract** within the CNRS lab.

## RRS

Residential Research Schools

Facilitate **transfer of knowledge** from basic concepts to advanced research results

### 2 weeks, 30k€

- ✓ Organisation of a thematic research school in Africa
- ✓ Regional dynamics encouraged

## VF

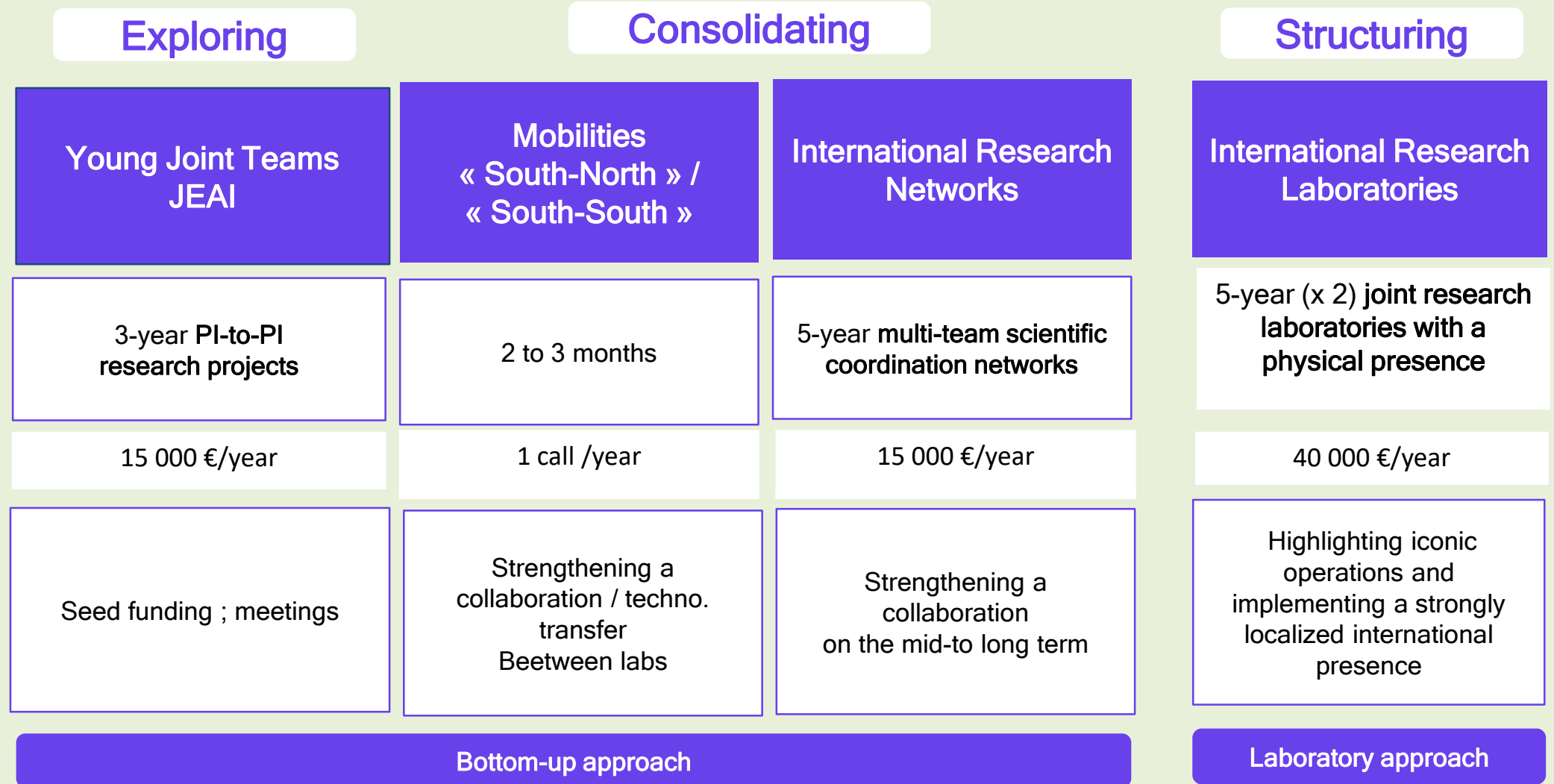
Visiting Fellowships

Foster **networking** between two researchers at the start of their careers

### 1 year, 25k€ for mobilities

- ✓ Mandatory residential stay in the CNRS PI's lab
- ✓ CNRS PI encouraged to give lectures at the partner university (short-term assignment)

# Collaboration tools



# Tools for partnership

French Embassy



Liberté • Égalité • Fraternité

RÉPUBLIQUE FRANÇAISE



Institut de Recherche  
pour le Développement  
FRANCE



Master grants	<b>Mobility funding</b> Travel & stays in France for Master & PhD (3)			
PhD grants		<b>ARTS</b> Travel & stays in France for PhD (2 Zimb. 2 Moz.)	<b>Joint PhD program</b> (5 - Wits)	
Starting collaboration	<b>PHC Protea</b> Mobility (3)	<b>JEAI</b> Young team Research & training	<b>IEA (1)</b> International Emerging Action	
hosting scientists building projects			<u>JRP</u> Joint Research Prog (3) <u>RRS</u> residential research school (3) <u>Visit Fell</u> (1)	
Networking		<b>IRN (4)</b> Int. Research Network	<b>IRN (6)</b> Int. Research Network	<b>DP</b> (Platforms in partnerships for research training) (1)
Joint projects			<b>IRP (5)</b> Int. Research Projects	
Int. joint/associated laboratories		<b>LMI (1)</b> Int. Joint Lab.	<b>IRL (1)</b> Int. Research Labs.	
International joint units	<b>UMI (1 - IFAS)</b> Int. Joint Unit		<b>UMI (1 - IFAS)</b> Int. Joint Unit	

# Networks (including South-Africa)

Name	Thematic	Southern Africa	Africa	Others
CSQ - CNRS	Society for the Social Study of Quantification			GB - USA
FRIMATH - CNRS	Mathematics		Algeria, Benin, Burkina Faso, Burundi, Cameroon, Comores, Congo, RDC, Côte d'Ivoire, Gabon, Ghana, Guinea, Mali, Morocco, Mauritania, Niger, Nigeria, Senegal, Ouganda, Togo, Tunisia	Canada, USA, Colombia, Danmark, France, Germany, Norway, UK
GRANDIA - CNRS	Geometry, Arithmetics		Madagascar	Danmark
HAMSA - CNRS	Art Rock	Botswana Namibia Zimbabwe		
SOUTH STREAM - CNRS	Cultural platform		Nigeria	Turquie, India, Brasil, Chili, USA
MAULINE - CNRS	Physics	Botswana	Morocco	Italy, Spain
FRIMAQUA - IRD	Aquaculture	Namibie	Côte d'Ivoire, Kenya, Maurice, Sénégal, Tanzanie	
PROCO - IRD	Oceanography	Mozambique Madagascar	Côte d'Ivoire, Sénégal	Viêt Nam
ASSPORT-2C - IRD	Plastic, pollution	Mozambique Madagascar	Cote d'Ivoire, Senegal	Viet Nam
UMSUD - IRD	Urbanization, digital		Burkina Faso, Senegal	
P-PCP - CIRAD	Production conservation	Zambia Botswana Zimbabwe Mozambique		



## Next steps?

**Develop sub regional partnership, including with francophone Africa**

**Focus on interdisciplinary project with societal impacts**

**Promote our partnership, including mobilities of students and scholars to France or other african countries**



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**Thank you for your attention**