

# rednesp

*Research and Education Network of São Paulo*

## **AmLight SA3CC Meeting**

### **August 01-02, 2023**

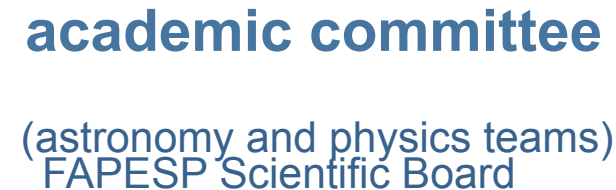
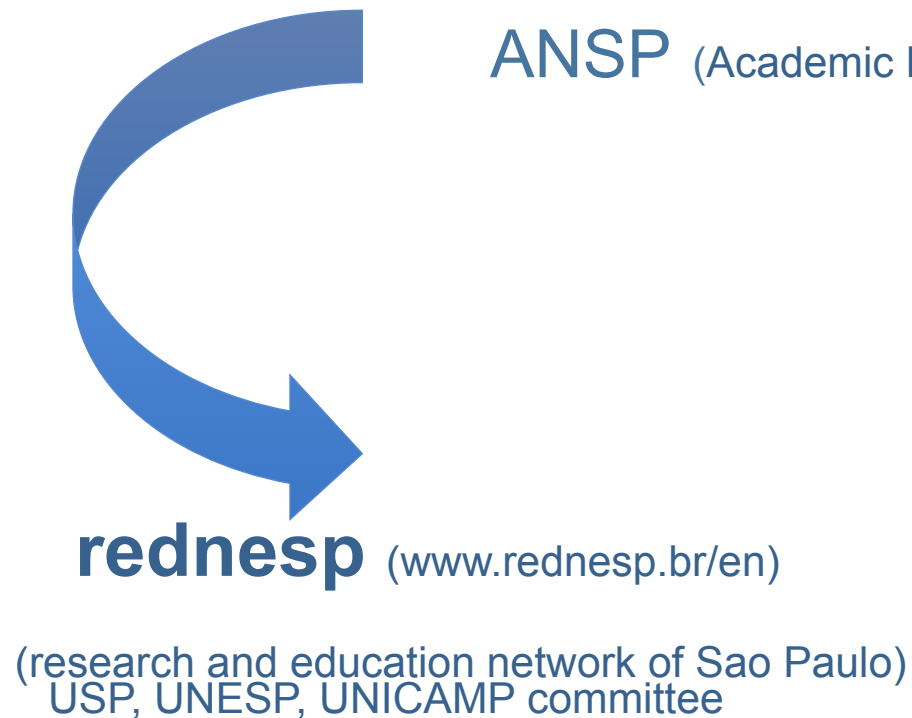
## **Agenda: 7 current rednesp efforts**

**Prof. Dr. João Eduardo Ferreira (jef)**

**(University of Sao Paulo - USP)**

[jef@ime.usp.br](mailto:jef@ime.usp.br)

# from ANSP to rednesp



USP (University of Sao Paulo)  
UNESP (São Paulo State University)  
UNICAMP (State University of Campinas)

# First Effort: Financial Investment

- **USD 5 M by year** in last 16 years  
for providing Atlantic and Pacific links (orange lines)  
in the AmLight cooperation and rednesp  
connections.
- **Funded by FAPESP**  
(The Sao Paulo Research Foundation)  
<http://fapesp.br/en>



# Second Effort: technical collaboration management of international connections



**Resilient Links (2 x 100 Gbps)**

Funded by FAPESP-rednesp and provided by Lauren

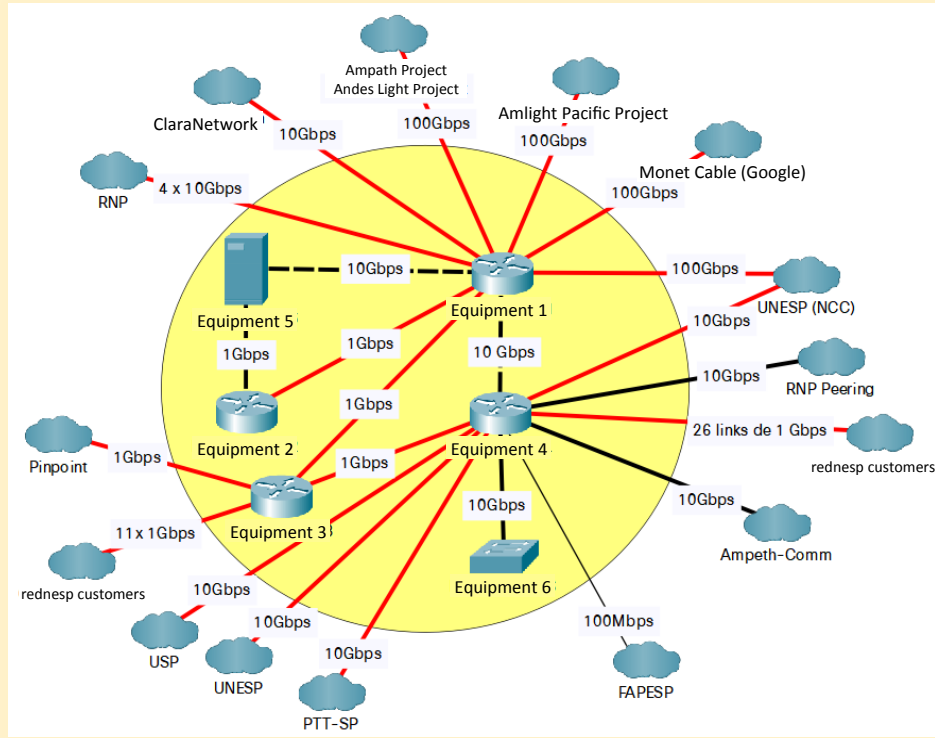
**Monet Link (2x 100 Gbps)**

Provided by AmLight cooperation

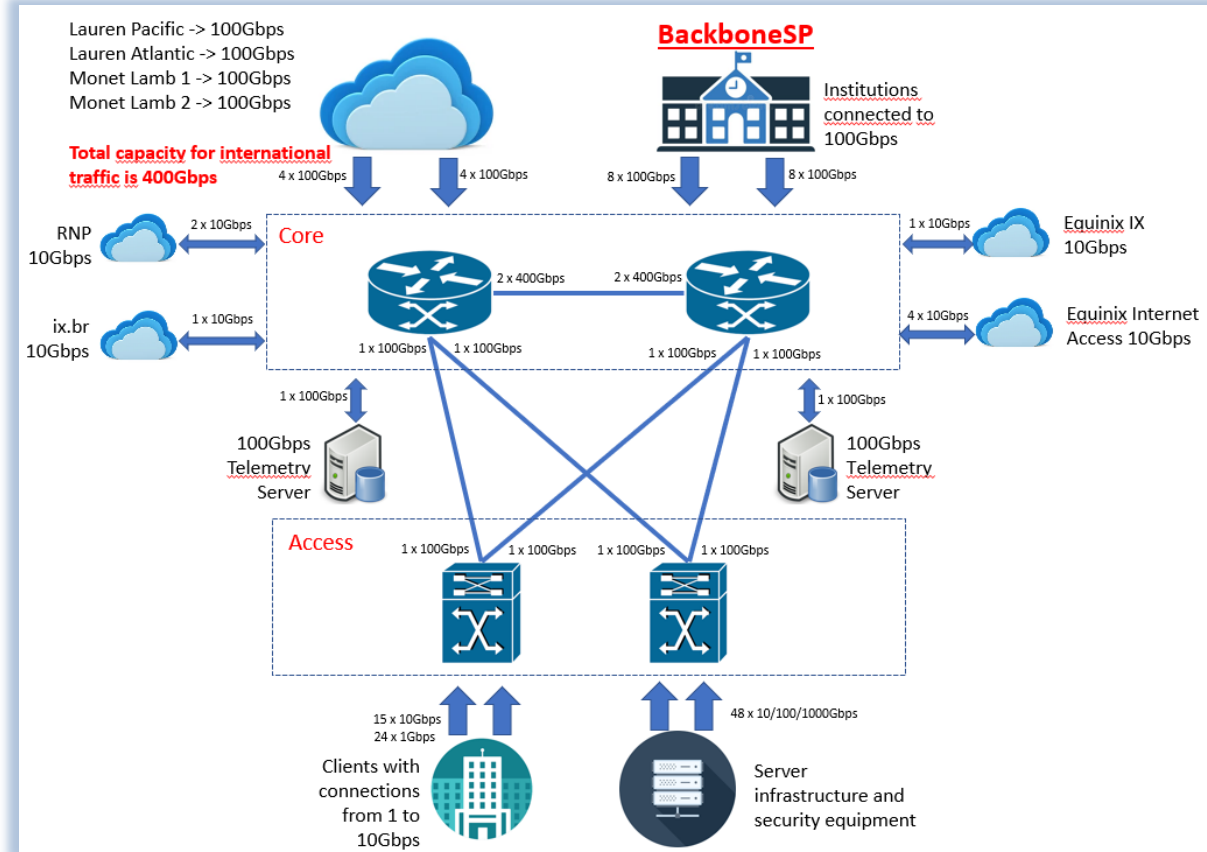
**Ella link (Bella Programme)**

Provided by European effort and RNP management in Brazil

## Old infrastructure –100Gbps



## New infrastructure - 400Gbps



Obsolete and discontinued equipment

- limited capacity
- no possibility of upgrade
- no possibility of growth



**State-of-the-art Juniper equipment**

- capacity of up to 14.4Tbps per slot
- PTX10004 has 4 slots totaling 57.6Tbps

Investment of USD 500 thousand

## New cage - Equinix

front view



background view



# Fourth Effort: Backbone-SP



Integrating 8 academic institutions  
at 100Gbps in the State of Sao Paulo

## Integrating academic institutions by Backbone-SP



The Brazilian Synchrotron Laboratory

High availability connectivity infrastructure using 100Gbps for supporting teaching and research in the State of São Paulo

- Backbone for state and international connection using high speed
- Protocol-transparent point-to-point links
- Alternative for interconnection of research centers in the State of São Paulo
- Backbone for integration of HPC servers

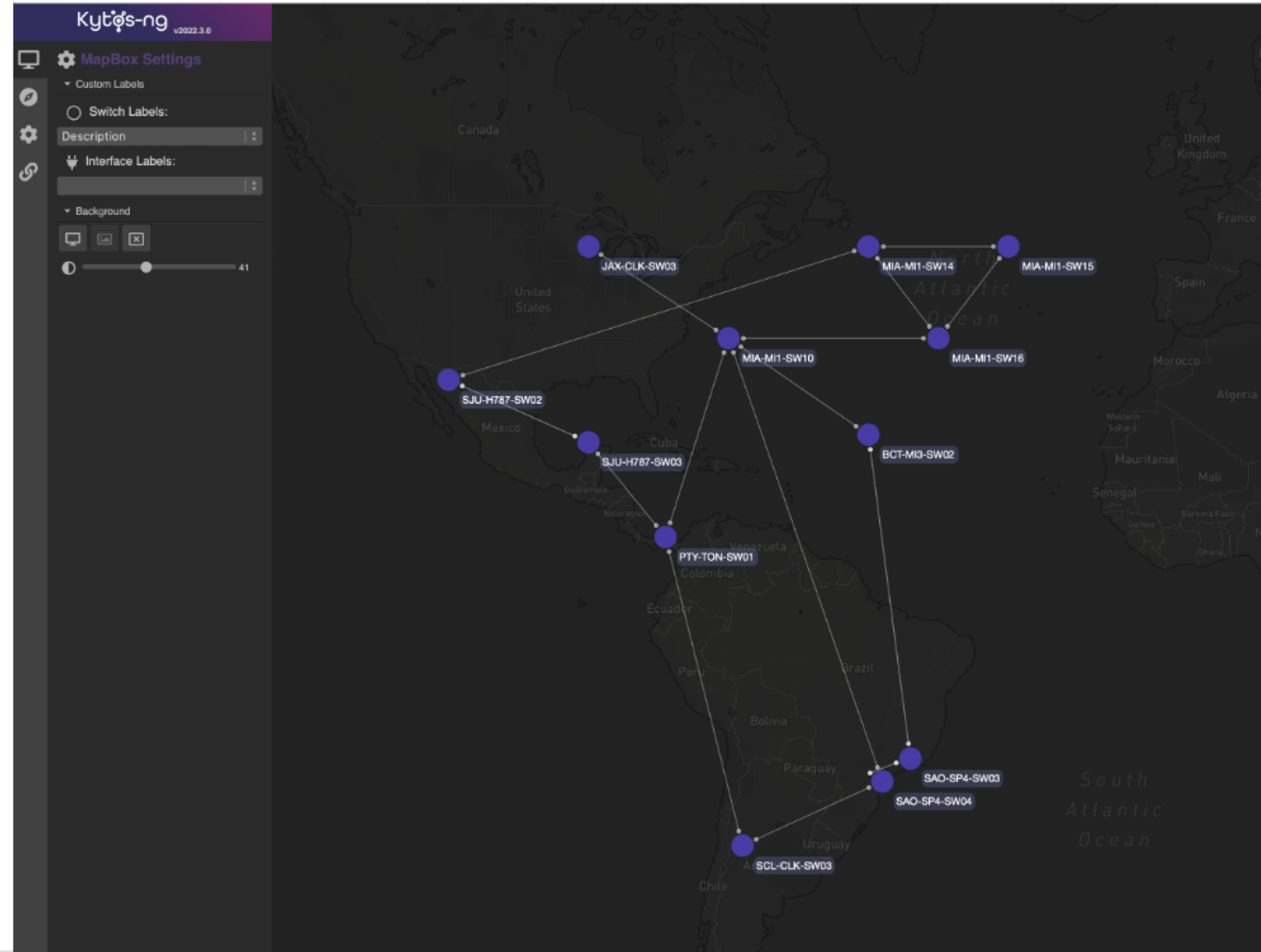


# Fifth Effort: Kytos-ng

- SDN platform
  - SDN Controller
    - orchestration of SDN switches of the Pacific/Atlantic ring connecting São Paulo/BR to Florida/US
  - Multi-component architecture
  - Framework to develop Network Applications (NApps)
    - E-Line (Point-to-Point Ethernet virtual circuits)
    - LLDP network topology discovery
    - Pathfinder for computing constrained best paths
    - Bidirectional Forwarding Detection (BFD)
    - INT In-band network telemetry
  - Controlled by REST APIs or Web UI
- Open source code available at Github repository
  - [<https://github.com/kytos-ng>]
  - Source-code and release notes are publicly available

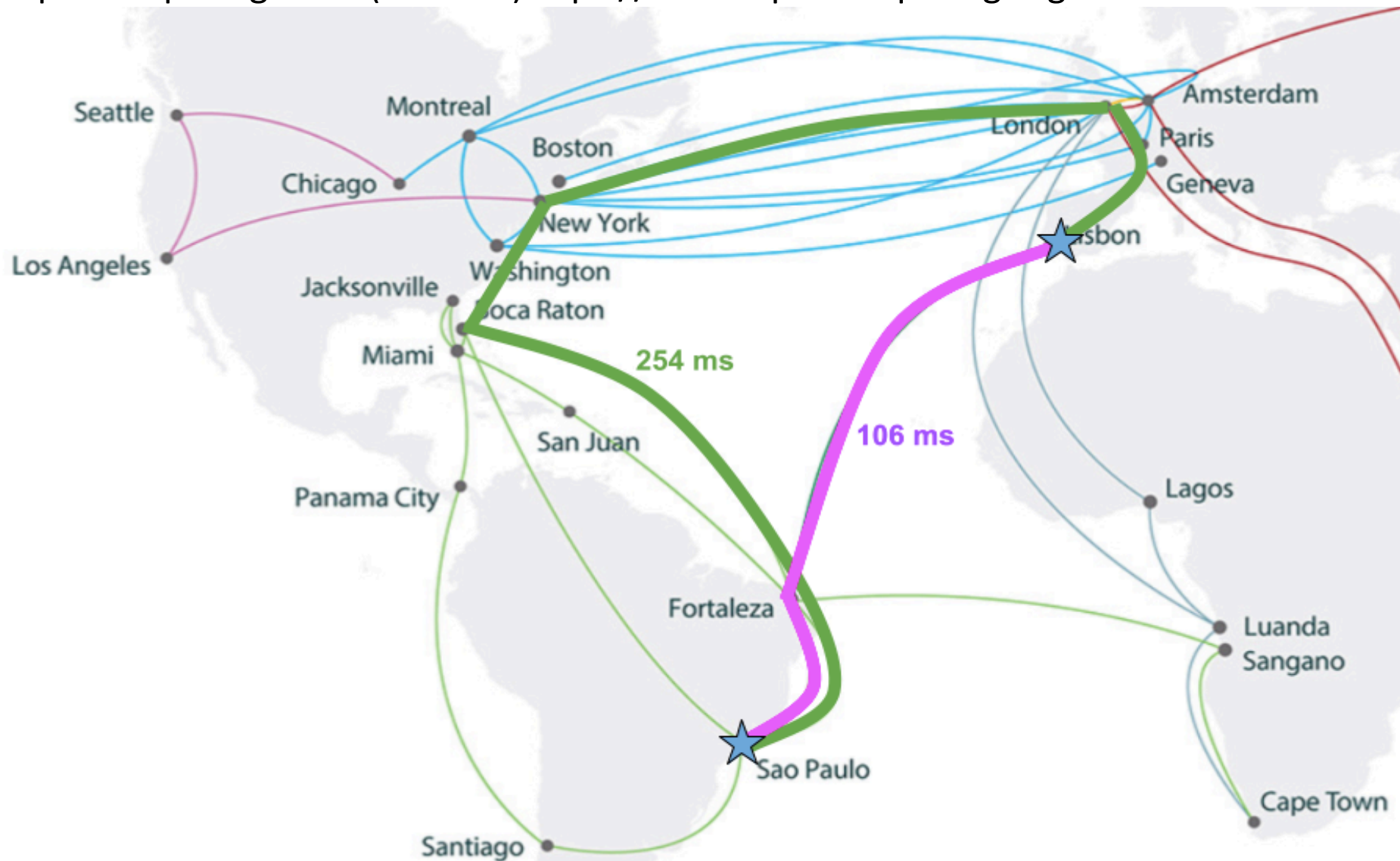
# Fifth Effort: Kytos-ng next steps

- rednesp contribution for Kytos-ng 2023.2
  - Upgrade core component of Kytos-ng
  - Support development/ evolution UI



# Sixth Effort: SC 2023 experiment

Supercomputing 2023 (SC 2023) <https://sc23.supercomputing.org>



# Seventh Effort: Adding projects

- **Observatory - Cherenkov Telescope Array (CTA)** <https://www.cta-observatory.org/>

Prof. Luiz Vitor de Souza Filho – PI FAPESP in the CTA cooperation grant

the main goal: linking the observatory from Chile to Europe for study the extreme environments of the universe through detection of the **highest known energy radiation** such as the explanation of dark matter , the possibility of breaking of Lorentz invariance and understanding how supermassive black holes operate.

- **Integrating High Performance Computing Centers in Sao Paulo**

the main goal: provide the Scientific and Technological Cooperation Agreement between FAPESP, MCTI and MCom ([fapesp.br/8388](http://fapesp.br/8388)) - USD 20 M.

# rednesp-FAPESP teams and Partners

## FAPESP

Prof. Dr. Marco Antonio Zago - President

### Administrative-Technical Board (ATB)

- Prof. Carlos Américo Pacheco – Director of ATB
- Prof. Márcio de Castro Silva Filho – Scientific Director
- Prof. Fernando Menezes de Almeida – Administrative Director

## rednesp university committee:

- Prof. João Paulo Gois / UFABC
- Prof. Calebe de Paula Bianchini / Mackenzie
- Prof. Paulo Bandiera Paiva / UNIFESP
- Prof. Hermes Senger / UFSCar
- Profa. Cecilia de Azevedo Castro Cesar/ITA
- Prof. João Eduardo Ferreira/USP
- Prof. Ney Lemke / UNESP
- Prof. Ricardo Dahab / UNICAMP

## rednesp executive committee

- Prof. João Eduardo Ferreira (USP) – Coordenador
- Prof. Ney Lemke (UNESP)
- Prof. Sandro Rigo (UNICAMP)

## rednesp technical team

- Prof. Carlos Antônio Ruggiero
- Bruno Ferreira Baldim
- Paulo Sérgio Simionato
- Rogério Motitsuki
- Ana Maria Dias Cerqueira

## USP collaborators

- Jorge Marcos de Almeida
- Mauro Cesar Bernardes
- Marcia Martins

## Partners - Backbone SP



## Partners



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**Thanks!**

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**(University of Sao Paulo - USP)**  
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