



SPRACE

Two Postdoctoral Positions in the CMS Experiment

CESAR A. BERNARDES FOR THE SPRACE TEAM

SPRACE

**We do not hire skilled people and motivate them.
We hire already motivated people and inspire them.**

(after Simon Sinek)

Introduction

The São Paulo Research and Analysis Center (SPRACE) is opening postdoctoral positions for outstanding research fellows to work in association with the UNESP group on the Compact Muon Solenoid (CMS) experiment of the CERN Large Hadron Collider (LHC). Grant funds are provided by FAPESP, the São Paulo Research Foundation.

The SPRACE research team is engaged in two CMS physics analysis groups: Exotic physics (Beyond the Standard Model) and Heavy Ion physics. SPRACE also operates a WLCG Tier-2 cluster and is responsible for the implementation of a state-wide grid infrastructure, GridUNESP, which serves more than 100 research groups from different scientific communities. SPRACE is also involved in R&D activities on the conceptual design, simulation and proof-of-concept of the data acquisition (DAQ) electronics of the outer tracker detector of the CMS experiment.

List of Members of the Research Group

Prof. Sergio Novaes – Group Leader

- ❑ Search for dark matter in proton-proton collisions
- ❑ e-science and machine learning techniques associated to HEP

Prof. Eduardo Gregores – Deputy Group Leader

- ❑ Coordination of SPRACE CMS engineering group

Prof. Gastão Krein

- ❑ Theory projects and research activities related to the strong interaction

Prof. Pedro Mercadante

- ❑ Coordination of SPRACE CMS BSM physics group

Prof. Sandra Padula - Deputy Group Leader

- ❑ Coordination of SPRACE CMS Heavy Ion physics group

Prof. Thiago Tomei

- ❑ Search for dark matter in proton-proton collisions
- ❑ High-level Trigger in CMS
- ❑ Machine Learning techniques associated to HEP

Prof. Cesar Bernardes

- ❑ Studies and physics analyses in heavy ion collisions.

Activities

The candidates directly involved in the CMS experiment are expected to have a Ph.D. in Experimental High Energy Physics. A previous experience in one of the LHC experiments is an important asset. She/he should have the ability to carry out independent research in HEP and carry out physics analyses related to those of interests to the SPRACE group, and must:

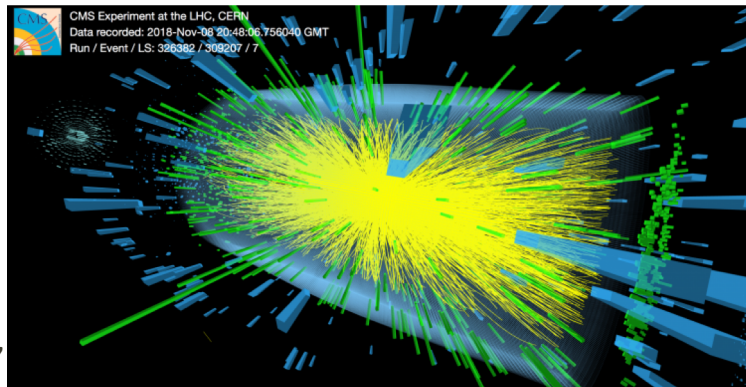
- Help to comply with our responsibilities in the collaboration.
- Interact with different HEP groups worldwide.
- Travel to CERN (whenever possible) to work on site.
- Support and advise interns and students in the project.

Position in the CMS HIN Group

Physics analyses & data taking activities
in the CMS Heavy-Ion Group

Group expertise

- ❑ Data analyses: Study of the Quark-Gluon Plasma using flow & correlations
 - Few examples:
 - Phys. Rev. C **97**, 064912 (2018), Phys. Rev. Lett. **120**, 092301 (2018), JHEP **03**, 014 (2020), Phys. Rev. Lett. **129**, 022001 (2022)
- ❑ High Level Trigger and Offline Tracking
 - CMS DP-2023-011

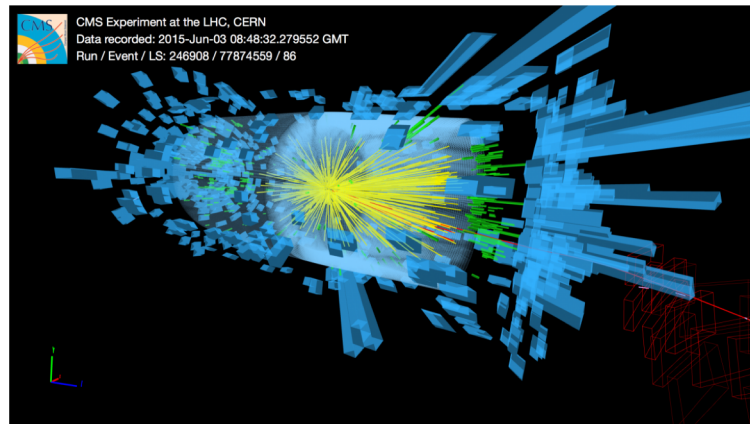


Position in the CMS Exotica Group

Physics analyses & data taking
activities in the CMS Exotica Group

Group expertise

- ❑ Data analyses: BSM searches (currently with focus in Dark Matter)
 - Few examples: JHEP 06 (2018) 127, Phys. Rev. D 97, 092005 (2018)
- ❑ High Level Trigger & Machine Learning Applications in HEP
 - Evaluation of Generative Models in HEP arXiv:2211.10295 (Submitted to PRD)



Deliverables

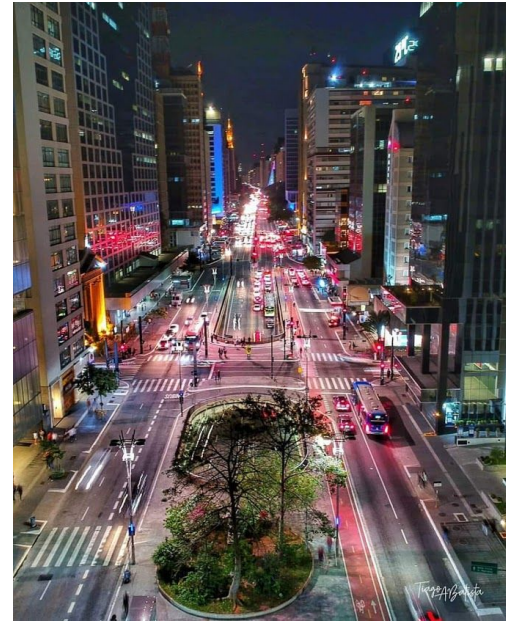
At least one full-fledged analysis with Run-3 data.

Heavy involvement in the service activities.

Other information (1)

Location: São Paulo, Brazil

- ❑ The monthly income is fixed by FAPESP and nowadays is R\$ 8.479,20. In addition to the income, the candidate will receive:
 - Provides a good standard of living in the city of São Paulo
 - Travel ticket to/from São Paulo
 - Installation aid corresponding to one month of salary
 - 10% of the yearly income to cover expenses with traveling, participation in conferences, equipment, etc.
- ❑ Missions to CERN / participation in conferences / shifts expected!
 - After 6 months of your start in Brazil
 - Possible to stay up to 1 year at CERN (via a special sub-grant within the position)



Other information (2)

Potential collaboration with other institutes

- CERN (Trigger, ML)
- Ohio State University (Dark Matter)
- Rice University & University of Illinois at Chicago (Heavy Ions)

Appointment Period

- These appointments are initially for 2 (two) years and it could be extended up to 4 (four) years, depending on the results of midterm evaluation carried out by a committee from the funding agency.

How to apply

SPRACE is committed to the principles of equal opportunity and affirmative action. Applications from any sexual orientation and members of minority groups are encouraged.

Please provide an application letter, résumé of work experience, and at least two letters of recommendation to cms@sprace.org.br.

Please, see further information, here:

<https://www.sprace.org.br/twiki/bin/view/Main/OpenPositions>



SPRACE

Thank you!

CMS@SPRACE.ORG.BR