

Review form

Second Phase Evaluation - call 2/2018

After a scientific merit review process ([first phase evaluation](#)), 24 proposals are awarded one-year seed grants of up to R\$100,000 (~U\$20K). The progress of these awardees is evaluated during the one-year grant* period and 3 individuals are selected (second phase evaluation) to receive an additional three-year award of R\$700,000 (~U\$130K) with a bonus of R\$300,000 (~U\$56K) for hiring and training students from under-represented groups in science.

The following describes how the second phase selection process will take place.

Because one year is often insufficient to expect any relevant scientific production, the evaluation should be based on **the way candidates are executing their scientific project rather than on their scientific productivity per se**. Of course, in the event that relevant scientific work is produced, these should be taken into account.

**please consider that when the COVID-19 pandemic reached Brazil in March 2020, 75% of the one-year period was completed, which impacted all projects but experimental ones in particular. The scientific evaluation should, therefore, only concern work performed before March 2020. The capacity of the candidate to maintain a positive group dynamic during the pandemic may as well be considered as it can be analyzed as the third criteria described below.*

Grantee: **Thiago Tomei**

Reviewer(s): **1**

Evaluation criteria

Our objective is to identify excellent young scientists in Brazil, and we are therefore looking for scientists who are able to compete with the leading figures in their respective fields worldwide. Our evaluation criteria combine the merit of the scientific question to be

addressed and the individual's ability to complete the project successfully. The focus is on the perceived capacity of the investigator to execute a **strong research agenda**.

To be funded by Serrapilheira, scientists and their proposals should meet four general criteria:

1. The project should be of extreme importance to other scientists in the field in question, potentially challenging traditional ideas.
2. The project should be innovative, and the applicant should demonstrate the ability to develop a novel approach to the research question.
3. The applicant should be able to re-think, re-organize, and optimize their experimental plans, adapting their research program rapidly, conceptually and technically as needed. Markers for this criterion may be how the researcher responds to issues such as (1) failed experiments, (2) technical mishaps, (3) publications that change the state of the art, or other predictable and unpredictable events. We want to assess whether the candidates are equipped to meet the challenges of a constantly evolving scientific environment.
4. The applicant should exhibit a comprehensive understanding of the field and demonstrate how their line of inquiry will impact the scientific landscape in their area of expertise.

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There should be a discernible reason why the work deserves funding by Serrapilheira as opposed to other granting agencies.

In your opinion, this proposal deserves to be funded with an additional three-year award of R\$700,000 (U\$130K) with a bonus of R\$300,000 (U\$56K) for hiring and training students from under-represented groups in science?

Please justify your answer. Ad hoc reviewers should produce reviews that address the four criteria as well as strengths and weaknesses, with a summary statement.

REPORT:

This project is about the development of Machine Learning techniques to experiments performed at the LHC (CERN, Geneva).

The Principal Investigator (PI) is working with the CMS Collaboration, which is a large project hosted at the Large Hadron Collider at CERN to investigate elementary particles, in particular the Higgs boson. This project is incorporating important developments and techniques in computer science, mainly from Machine Learning. The contribution of this project is in this topic, in particular the development of new algorithms for track reconstruction of charged particles and the development of a synthetic generator for hadronic jets. These objectives will be important contributions to the LHC and will allow for a more detailed analysis of the huge amount of data produced by the accelerator.

The report mentions as the top accomplishment of the project, the seeding of two collaborations (with Dr. Pierini who is a Staff researcher at CERN working on the hadronic jet generation) and with a group on the track reconstruction front (Exa.TrkX group).

The project did not yield any publication during its first year.

After the first year the group decided to abandon the Long Short Term Memory (LSTM) approach originally planned for the track reconstruction (for which they say they had a partial failure) and join the Exa.TrkX project which is using graph neural networks. However, they are optimistic about the progress in the hadronic generation topic.

During the first year two master students were hired.

This project hasn't proved to be successful to date, however, it looks promising.