

FAPESP Post-doctorate Fellowship opportunity in Modeling a decade of carbon gross emissions from forest fires in the Amazon

The Tropical Ecosystems and Environmental Sciences Laboratory (TREES) at the Remote Sensing Division (DSR), National Institute for Space Research (INPE) is offering a FAPESP post-doctoral fellowship opportunity for "***Modeling a decade of carbon gross emissions from forest fires in the Amazon: Conciliating the bottom-up and top-down views of the problem***". The deadline for applications is **May 31, 2018**.

The fellowship is part of the Thematic Project 2016 / 02018-2 entitled "***Interannual variation of Amazon Basin greenhouse gases balance and their controls in a warming and increasingly variable climate - CARBAM - The Amazon Carbon Balance Long-term Study***", under supervision of project principal investigator Dr. Luiz Aragão from INPE.

The selected candidate will integrate a project team that investigates the consequences and effects of climate change and human impacts on the greenhouse gas balance of the Amazon basin. The aim of the post-doctoral project within the Thematic Project is answer two questions: (1) What are the main sources (land-cover types) of fire emissions? (2) Are these emissions a result of fires from fast turnover grassland vegetation, with minor impact on the overall atmospheric CO₂ accumulation, or are they related to slow turnover forest vegetation, with potentially high impact on the atmospheric CO₂ accumulation? To answer these questions the general aim is to systematically quantify annual gross carbon emissions from forests affected by fires at the Amazon biome scale and attribute its relative contribution based on the potential CO₂ emission sources from fires. This project is a part of the Thematic program to determine greenhouse gas balance, initiated in 2010, which by 2020 will complete a decade of atmospheric data capable to provide unique information to better understand the role of Amazon for the global carbon balance and how Amazon is changing with climate variations and land use change.

Candidates must have obtained their PhD degree within the last 7 (seven) years, in Brazil or abroad. The successful candidate must be fluent in English or Portuguese and have an excellent understanding of forest ecosystem functioning, specially the C cycle and skills in geographic information systems, image processing and computer programming as tools for quantifying gross C emissions from fires in Amazonia. The candidate is expected to dominate the analysis and visualization of scientific data using software or computer languages such as ARCGIS, QGIS, ENVI, Rstudio, PHYTON, IDL that will allow the successful development of the work. Previous experience in Amazonian studies, fieldwork experience, fire emission modeling and willingness to learn Portuguese is desirable.

The post-doctoral fellow will develop his/her research activities in the TREES lab at DSR, INPE, Sao Jose dos Campos, Brazil.

Activities to be developed by the fellow involve the (1) creation of wall to wall maps of burned area at the end of the dry season using a linear spectral mixing model applied to surface reflectance images from the Moderate Resolution Imaging Spectroradiometer (MODIS); (2) integration of land use and land cover maps with burned areas using the outputs of TERRAClass project from INPE and separate the different sources of fire; (3) improvement of the computational structure (IDL or translation to other language) of the emissions model to include long-term biomass loss data from forest areas based on field surveys (may involve fieldwork in remote areas of the Amazon); (4) estimation of carbon emissions based on the FATE model adjusted with empirical relationships for biomass losses during fire for different land use types for the studied period; (5) dissemination of results through public lectures, international conferences and research papers. The successful candidate will have the opportunity to supervise graduate scholars at Master and PhD levels.

These estimates will be aligned with the atmospheric-based analysis proposed in the project. The final results from the model will be then used for the inter-comparison with the aircraft measurements data.

Candidates must send e-mail with the title "Pos-Doc CO2 FAPESP TREES" to luiz.aragao@inpe.br with copy to Luciana.gatti@inpe.br, attaching the following files:

- 1) Presentation letter describing your motivation to participate in this project;
- 2) Curriculum Vitae;
- 3) Letter describing their professional training and experience with forest ecosystem functioning, specially the C cycle, geographic information systems, image processing and computer programming as tools for quantifying gross C emissions from fires in Amazonia
- 4) Provide 3 professional reference names that can be contacted by the judging committee.

The opportunity is open to Brazilians and International applicants. The selected candidate will be granted with a Fapesp Post-Doctoral Fellowship. The salary corresponds to R\$ 7,174.80 per month, in addition to an additional 15% of this value as Technical Reserve, which can be used for expenses with the project activities. In the initial concession, the duration of the grants may be up to 24 months. There may be renewal for another two periods of up to 12 months each, totaling a maximum of 48 months. More information at www.fapesp.br/bolsas/pd#2.2 and <http://www.fapesp.br/5389>.