Call for FAPESP Post-doctoral fellows for the Regular Research Project "*Evaluation of public policies for the development of green corridors to agrologistics in Brazil* (FAPESP – BELMONT FORUM – Process 2017/50420-7). The research project will be developed at the Research and Extension Group in Agro-industrial Logistics - ESALQ-LOG headquarters, which is part of the "Luiz de Queiroz" College of Agriculture – ESALQ-USP, located at Avenida Pádua Dias, 11, Piracicaba, São Paulo. The duration of the fellowship will be 33 months, with the possibility of an extension of additional 3 months.

The consortium agreement titled "Intelligent Urban Metabolic Systems for Green Cities of Tomorrow: an FWE Nexus-based Approach", to be developed under the Belmont Forum by National Taiwan University (NTU) – Taiwan, University of São Paulo (USP) – Brazil, Research Institute for Humanity and Nature (RIHN) – Japan, and by University of Illinois at Urbana-Champaign (UIUC), USA, has as one of its sponsors the Brazilian agency "São Paulo Research Foundation" (FAPESP), through the grant number 2017/50420-7. The technical coordinators for each Party are: NTU, Fi-John Chang; USP, José Vicente Caixeta Filho; RIHN, Makoto Taniguchi; UIUC, Luis F. Rodríguez.

Top candidates will be pre-selected by a qualified committee, and may be contacted for an in-person or online interview within the last two weeks of September 2018.

The two selected candidates must be fluent in English (listening, speaking, and writing), as well as meet all the requirements listed by FAPESP. FAPESP will then review all required documents to finalize the granting of the fellowships.

For the assignments to be developed under the sponsorship from FAPESP, two Post-Doctoral fellowships will be available at ESALQ-LOG (Piracicaba, SP), according to the details provided below.

ACTIVITY PLAN - Post-Doctoral fellowship #1

Title: Agrologistic corridors and modelling of GHG emissions

Supervisor: José Vicente Caixeta-Filho

Institution: University of São Paulo – USP / Escola Superior de Agricultura "Luiz de Queiroz" – ESALQ

ABSTRACT

Freight transport in Brazil is highly dependent on highways. Roads account for about 60% of the total cargo transported in Brazil, while in other countries of continental size, such participation is less than 30%. The high average age of the heavy-duty fleet and the inefficient infrastructure of road transportation (such as the low-density and the poor quality of highways) weaken the sustainability of road transport. As a result, the productivity of freight transportation in Brazil is low, while the fossil fuel consumption and the greenhouse gas (GHG) emissions are relatively high. In fact, the statistics indicate that the transport sector is responsible for about 35% of consumption of the oil product and over 40% of GHG emissions in Brazil. On the social side, the number of accidents involving trucks in Brazil is extremely high (approximately 66,000 per year). The low productivity of national transport also increases freight costs and affects negatively the competitiveness of Brazilian products, especially in the agricultural sector. There is an increasing awareness that green supply chains can be also competitive, either because of the awareness of the environment helps productivity or because consumers expect it, particularly in wealthy countries. In this context, it is essential that studies suggest policies that promote environmentally-friendly logistics through incentives to increase productivity and reduce GHG emissions from transport. Such policies should involve medium and long-term actions, and focus on increasing the efficiency of the transport system as a whole, generating lower environmental impacts. Ultimately, such policies should encourage the development of flow corridors that are aligned to the concept of green logistics, reducing emissions and promoting the competitiveness of Brazilian agrologistics.

OBJECTIVES

This Post-Doctoral fellowship aims to:

i. characterize the main logistics corridors of select agricultural products and to quantify GHG emissions from transport;

ii. develop a mathematical optimization methodology for select agricultural products that can be replicated for other commodities in Brazil and in other countries; and

iii. identify potential investments in multimodal transport infrastructure to be created and/or expanded.

WORK PLAN

The objectives will be achieved in 36 months. The main activities involved are summarized in the following Work Schedule and are detailed in the sequence.

Work Schedule

Activity	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1- Characterization of the agrologistics corridors to be studied												
1a. Selection and characterization of three relevant agrologistics chain												
1b. Characterization of the respectives main logistics corridors												
1c. Structuring a survey for the characterization of Brazilian agribusiness logistics												
1d. Application of survey by interviewing representative stakeholders												
2- Modeling the current scenario												
2a. Construction of a database containing detailed information on transport indicators												
2b. Development of an mathematical optimization model:												
(i) to quantify the current GHG emissions in the logistics corridors of selected agricultural products												
(ii) to identify green corridors where GHG emissions can be reduced with the already available infrastructure												
3- Identification of potential investments to reducing the GHG emissions of freight transport												
4- Results and Conclusions												

WORK METHODOLOGY

1- Characterization of the main logistics corridors of selected agricultural products

Description:

Interview of agents involved in the main agrologistics corridors in order to (a) evaluate the main obstacles that inhibit the use of modal alternatives for transportation that could reduce emission levels; and (b) to collect information about the policies that contribute to the adoption of actions to mitigate the transport emissions.

Main activities involved:

• Characterization of the logistics chain of the three most relevant products (in terms of volume) in the Brazilian agribusiness sector, highlighting the agents involved;

• Characterization of the main logistics corridors of select agricultural products (transport and storage infrastructure, flows, modes of transportation, capacity of multimodal transport etc.);

• Survey market participants to characterize the Brazilian agribusiness logistics, identifying the main logistic bottlenecks, decision-making factors in the choice of the modal of transport, recommendations of new infrastructures and improvements in the system, among others;

• Interview government officials, shippers, trading companies, farmers, cooperatives, logistics operators, carriers, among others.

2- Modeling the current scenario

Description:

Development of a mathematical optimization model that allows (a) to quantify the current GHG emissions involved in the main logistics corridors of select agricultural products in Brazil; and (b) to identify green corridors where GHG emissions can be reduced, considering the available infrastructure. This methodology would be replicated in similar studies for other products in Brazil, or in other countries.

Main activities involved:

• Construction of a database containing detailed information on transport, such as costs for different modes, production, consumption, export/import, origin-destination matrix, fuel consumption etc.;

• Development of an optimization mathematical model:

(i) to quantify the current GHG emissions involved in the main logistics corridors of selected agricultural products in Brazil; and

(ii) to identify green corridors where GHG emissions can be reduced with the already available infrastructure.

3- Identification of the range of investments in Brazil relevant to reducing GHG emissions from freight transport

Description:

Identification of investments in transport and storage infrastructure more relevant to mitigate emissions and increase energy efficiency, i.e., the logistic opportunities that generate economic and environmental benefits through new green corridors.

Main activities involved:

• Strategic recommendations of expansion or creation of multimodal transport infrastructure and multimodal terminals aimed to reduce GHG emissions.

WORK PLAN JUSTIFICATION

The proposal for this fellowship contributes to an existing research group and should be developed in association with faculty from research institutions in São Paulo and in different countries. Moreover, the proposed research project is strongly linked to the study currently developed by the proposed host group in São Paulo. Therefore, this work plan is highly related to the objectives of the main project "Evaluation of public policies for the development of green corridors to agrologistics in Brazil". Moreover, the development of this study will also promote more interaction among distinguished researchers, young faculty and recent graduated researchers from different institutions located in the state of São Paulo.

All candidates must fulfill all requirements listed on the FAPESP website (http://www.fapesp.br/270#3.4). The net value of the fellowship (PD-BR) can be found at http://www.fapesp.br/3162.

The fellowship demands full-time dedication to the main project (except under conditions outlined in resolution PR Nº 13/2009, 15 July 2009). The fellowship holder will contribute to the development and to the adequate progress of the research project, as well as to the writing of reports and scientific articles.

Candidates must submit their application exclusively by email by September 14, 2018, with documentation attached in PDF format, to Prof. Dr. José Vicente Caixeta Filho, the researcher in charge of the project, at jose.caixeta@usp.br.

The list of documents required in the application process is:

a) *Curricular summary* (*instructions available at http://www.fapesp.br/en/6351*);
b) *Official graduate program transcript, listing grades for all courses taken (including any courses not passed or incomplete). The transcript must include the minimum criteria for passing (e.g. minimum grade). The official transcript must contain either an official university stamp or other proof of authenticity;*
c) *Doctoral degree diploma or certificate of conclusion. This document can be presented at a later time, but must be received before the fellow confirms his/her acceptance of the fellowship;*
d) *Fellows who are currently employed must present a declaration from their current employer showing they are taking unpaid leave to participate in the project. This document can be presented at a later time, but must be received before the fellow confirms his/her acceptance of the fellowship;*
e) *Cover letter indicating reason for interest in the scholarship, with a brief summary of his/her related experience;*
f) *Two recommendation letters.*

ACTIVITY PLAN - Post-Doctoral fellowship #2

Title: Assessment of trade-offs between economic costs and environmental benefits of public policies promoting the mitigation of GHG emissions from freight transport.

Supervisor: José Vicente Caixeta-Filho

Institution: University of São Paulo – USP / Escola Superior de Agricultura "Luiz de Queiroz" – ESALQ

ABSTRACT

Freight transport in Brazil is highly dependent on highways. Roads account for about 60% of the total cargo transported in Brazil, while in other countries of continental size, such participation is less than 30%. The high average age of the heavy-duty fleet and the inefficient infrastructure of road transportation (such as the low-density and the poor quality of highways) weaken the sustainability of road transport. As a result, the productivity of freight transportation in Brazil is low, while the fossil fuel consumption and the greenhouse gas (GHG) emissions are relatively high. In fact, the statistics indicate that the transport sector is responsible for about 35% of consumption of the oil product and over 40% of GHG emissions in Brazil. On the social side, the number of accidents involving trucks in Brazil is extremely high (approximately 66,000 per year). The low productivity of national transport also increases freight costs and affects negatively the competitiveness of Brazilian products, especially in the agricultural sector. There is an increasing awareness that green supply chains can be also competitive, either because of the awareness of the environment helps productivity or because consumers expect it, particularly in wealthy countries. In this context, it is essential that studies suggest policies that promote environmentally-friendly logistics through incentives to increase productivity and reduce GHG emissions from transport. Such policies should involve medium and long-term actions, and focus on increasing the efficiency of the transport system as a whole, generating lower environmental impacts. Ultimately, such policies should encourage the development of flow corridors that are aligned to the concept of green logistics, reducing emissions and promoting the competitiveness of Brazilian agrologistics.

OBJECTIVES

This Post-Doctoral fellowship aims to:

i. model select public policies in freight transport to reduce GHG emissions in the medium and long term;
ii. assess the trade-offs between economic costs and environmental benefits of public policies; and
iii. identify/propose the range of public policies in Brazil that are more relevant to reduce GHG emissions in medium and long term.

WORK PLAN

The objectives will be achieved in 36 months. The main activities involved are summarized in the following Work Schedule and are detailed in the sequence.

Work Schedule

Activity	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1- Characterization of the public policies in freight transport for mitigating GHG emissions												
1a. Identification of public policies in freight transport for mitigating GHG emissions												
1b. Selection and characterization of relevant public policies to be studied												
1c. Construction of a database containing detailed information on logistic indicators												
2- Modeling public policies in freight transport for mitigating GHG emissions												
2a. Development of a mathematical optimization model to:												
(i) quantify the environmental benefits of studied public policies												
(ii) quantify the economic costs involved in such policies												
3- Assessment of the economic and environmental trade-offs of public policies studied												
3a. Indication of effective public policies to promote green agro-logistics												
3b. Ranking of public policies in Brazil more relevant to reducing GHG emissions from freight transport												
4- Results and Conclusions												

WORK METHODOLOGY

1- Characterization of the public policies in freight transport for mitigating GHG emissions in medium and long-term

Description:

Identification and selection of potential public policies that contribute to the development of green logistics corridors, while minimizing the GHG associated with the transport of agricultural products.

Such public policies can involve, for instance:

- in the medium-term: development of heavy-duty fleet renewal programs; programs to reverse logistics of old vehicles (vehicles disposal strategy); investments in improving road conditions; and, incentives to reduce idle vehicles in return operations through collaborative logistics.

- in the long-term: investments in intermodal infrastructure that promote GHG emissions reductions and the development of new green corridors.

This methodology would be replicated into similar studies for other products in Brazil or even in other countries.

Main activities involved:

•Identification of public policies in freight transport that promote the mitigation of GHG emissions in medium and long term;

•Selection and characterization of relevant public policies to be studied, in the medium and long term;

•Construction of a database containing detailed information related to characteristics of the truck fleet, conditions of the roads, existing and planned transportation infrastructure, etc.

2- Modeling public policies in freight transport for mitigating GHG emissions in medium and long-term

Description:

Development of a mathematical optimization model to assess the cost-effectiveness of public policies that contribute to the development of green logistics corridors, while minimizing the GHG associated with the transport of agricultural products.

Main activities involved:

• Development of an optimization mathematical model of the logistics system for the select agricultural products to:

(i) quantify the environmental benefits of select public policies (measured in terms of tons of GHG emissions avoided);

(ii) quantify the economic costs involved in such policies.

3- Assessment of the trade-offs between economic costs and environmental benefits of public policies studied

Description:

Analysis of the results of the optimization model, and the determination of the cost-effectiveness (US$/ton CO2e) of select public policies; and identification of the most relevant investments in public policies to mitigate emissions and to increase energy efficiency (i.e., the logistic opportunities that generate economic and environmental benefits through new green corridors).

Main activities involved:

• Indication of effective public policies to promote green agrologistics, considering the potential mitigation of GHG emissions and their respective monetary costs;

• Identification of the range of public policies in Brazil more relevant to reducing GHG emissions from freight transport in the medium and long term.

WORK PLAN JUSTIFICATION

The proposal for this fellowship contributes to an existing research group and should be developed in association with faculty from research institutions in São Paulo and in different countries. Moreover, the proposed research project is strongly linked to the study currently developed by the proposed host group in São Paulo. Therefore, this work plan is highly related to the objectives of the main project "Evaluation of public policies for the development of green corridors to agrologistics in Brazil". Moreover, the development of this study will also promote more interaction among distinguished researchers, young faculty and recent graduated researchers from different institutions located in the state of Sao Paulo.

All candidates must fulfill all requirements listed on the FAPESP website (http://www.fapesp.br/270#3.4). The net value of the fellowship (PD-BR) can be found at http://www.fapesp.br/3162.

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c) Doctoral degree diploma or certificate of conclusion. This document can be presented at a later time, but must be received before the fellow confirms his/her acceptance of the fellowship;

d) Fellows who are currently employed must present a declaration from their current employer showing they are taking unpaid leave to participate in the project. This document can be presented at a later time, but must be received before the fellow confirms his/her acceptance of the fellowship;

e) Cover letter indicating reason for interest in the scholarship, with a brief summary of his/her related experience;

f) Two recommendation letters.