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Statement of Interest/Proposed Research

a. Research plan

Melipona is a stingless bee genus native to tropical America. The stingless bees or meliponines are social insects that store honey and pollen in their hives. In many cultures these products are used as a source of medicine and food, and in the Mesoamerican region, people have reared them artisanally for thousands of years. As highly social bees, they are often key pollinators in agriculture. Despite this, they are threatened by increasing habitat loss and, active destruction of their colonies for honey collecting. The lack of identification tools makes the application of effective management and conservation strategies difficult. Thus it is essential to provide identification guides for these bees, based on updated taxonomic information, to permit their management and conservation.

My PhD. project aims to update the taxonomic knowledge of the bee species of the stingless bee genus *Melipona* for the Mesoamerican region by combining morphological, molecular and geographic information and also to propose geographic areas to be included as part of the conservation systems of the countries of the region. The preliminary results, combining the three types of data, have provided information that supports the definition of some of the conflictive species as actual species. Nonetheless, for other species the amount of data is not enough to generate reliable conclusions. Another objective of my project is to elaborate an illustrated identification key for the species. Lastly, the project aims to produce accurate maps of species distributions that will help to the definition of the species and to propose conservation areas. For the success of these tasks, it is essential to have access to the combination of digital imaging, large collections of bee specimens and large amount of collecting geographic information. The visit to the proposed institution will provide all these elements and will help to improve and complement the results obtained so far.

b. Intended outcomes in terms of my PhD research and professional development

The direct intended outcomes of the visit in terms of my PhD research are: 1) To complement the taxonomic treatments of the species and to complete the identification key, through: a) studying additional specimens to be able to define the species status of the taxa that have problems and for which I have few data, b) studying the types of *Melipona* species to support the decisions on the species status, c) taking high resolution images of diagnostic characters to be included in the illustrated identification key of the species; 2) To produce accurate digital maps of the species distribution particularly of the species for which I have few data, through obtaining geographic information of the collecting localities of the species; and 3) To identify environmental determinants of species distributions using ArcGis to be able to propose conservation areas that includes these important pollinators.

This information will be subsequently put together to produce two paper, one including the taxonomic revision of the stingless bee species of the genus *Melipona* of Mexico and Central America and the other one including an analysis of the geographic distributions of the species and the perspectives of their conservation based on these distributions.

In terms of my professional development the exchange would permit me to improve my skills in stingless bee taxonomy and in bee taxonomy in general. The training in detecting subtle morphological differences among very similar species will be of great help. It is very common for closely related bee species to be extremely difficult to tell apart, yet it is essential for us to be able to do this if the species are to be managed for agricultural pollination and honey production for nutrition and medicine. Having access to technical training on software for mapping and analyzing spatial distribution patterns will also be of long term benefit because this is a tool that I can use to answer similar questions for other important species.

c. Description of why I chose the USDA-ARS Pollination Insect Research Unit and how me and my home institute intends to continue the relationship with that institution

I chose the National Pollinating Insects Collection at the USDA-ARS BeeLab because it is one of the biggest collections of bees in the world and it includes a large collection of Mexican and Central American bees. I also chose this institution because my institution and I have already a relationship with Dr. Terry Griswold, bee taxonomist at the BeeLab. I have first met Dr. Griswold at the American Museum of Natural History's Bee Course in Arizona. After that, in 2009, we invited him to Guatemala to visit our collection and to participate in the international conference "VI Congreso Mesoamericano sobre Abejas Nativas" which we organized. During his visit to our collection he worked with some of my colleagues on the identification of the bees from the families Megachilidae and Apidae.

In 2010 I had the opportunity to visit his collection for a short period of time. While I was there I acquired some of the necessary literature on *Melipona*. I also had the opportunity to study most of the species of *Melipona* that I am interested in, and also, with Dr. Griswold's help, I was able to develop a set of diagnostic characters for some of the species. Visiting the collection again will help me to complete my PhD research with success since I will be able to study additional specimens, I will take high quality photographs to include in the identification key and I will have access to geographic information that will help me to produce accurate maps of the species distributions.

More over since Dr. Griswold has extensive experience with the taxonomy and systematics of bees of Mesoamerica, the collaboration between the two institutions in developing taxonomic work on the bees of Guatemala will strengthen the research done at my home institution, the Collection "Native Bees of Guatemala" of the "Biodiversity Research Unit", by doing high quality research.

d. Tentative budget for travel, lab equipment, housing, subsistence, and child care

Item	Amount
Travel (airfare: Guatemala-Salt Lake City-Guatemala; shuttle: Salt Lake City-Logan-Salt Lake City)	1 300.00
Lab equipment	500.00
Housing (5 months)	3 000.00
Subsistence (food, transportation, supplies) (5 months)	4 000.00
Child care	0.00
TOTAL	**8 800.00**