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Department of Natural History  
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Dear Committee Members:

I am writing to provide my strongest possible support of the application of Maria Beatriz de Souza Cortez, who is applying for an IAPT Research Grant. I have written letters for students for over 30 years, but as I will stress in more detail below, Maria is a particularly special student. One of the best we have ever had in our lab—the complete package of research excellence, a superb mentor of other students, and a person who works tirelessly for the benefit of others.

Maria is a superb graduate student working in the Soltis lab; one of our top students of all time (and we have had over 40 PhDs from the lab). Maria is from Brazil and first visited our lab as an undergraduate on a Brazilian government scholarship- she was broadly interested in plant systematics. After her visit she was determined to come back to the University of Florida for her PhD; after she completed her undergrad work and then a MS in Brazil, we were very excited to have her return to the lab in 2017 to continue her studies for her PhD.

Maria has an amazing project (below). As additional background, she already has a strong publication record with five papers already and a number of others in preparation. She has been very active at national and international meetings giving posters and oral presentations including a talk at the very prestigious Humboldt symposium.

In addition, Maria is involved in numerous outreach activities—giving back is an important part of her life ethic. She has won prestigious University and Biology awards for her service and leadership. I've rarely seen a student do so much for others and outreach – and she does all of this while also being a research leader. She has contributed to several outreach events promoted at the University of Florida, including the release of the One Tree, One Planet cell phone app and the citizen science event, Notes from Nature, held during Earth Day. She has produced a Portuguese translation for the short animated movie Tree Tender and interacted with girl scouts during the program She's a Scientist, teaching the scouts about plants using flowers and microscopes. She has served as a science fair judge and has engaged with visiting students from all ages and backgrounds during The Florida Regional Junior Science Engineering & Humanities Symposium, sharing her work and history as an international student.

In addition, Maria is active within the Biology Department and the University of Florida and has already stepped up to serve in different leadership positions. She was the first International Committee representative for the Biology Graduate Students Association, producing a detailed packet with useful information for incoming international students. She also served in the Welcoming Committee organizing a social event to welcome the incoming cohort on Fall of 2019. More recently she served in the department Awards Committee, having the chance to experience first-hand the process of grant appreciation and evaluation. Within the University of Florida, Maria serves in the International Student Issues Executive Committee, which enables her to interact with international students from departments across campus with the goal to raise awareness to particular issues concerning this specific demographic group.

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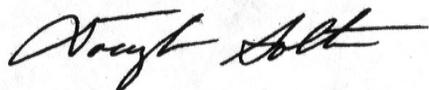
Her dissertation research is a remarkable undertaking with broad implications. Her work involves broad analyses of phylogenetic diversity across the *campos rupestres* in Brazil; these regions are small in geographic area, but harbor a disproportionately large amount of the flora of Brazil, including many endemics. In addition to broad scale analyses of phylogenetic diversity she also will live with local traditional peoples to better understand their use of the plants in this region (some of the plants are sold for use in dried flower arrangements). She is also investigating genetic diversity across case study systems as models—for this she has chosen one genus (below). The *campos rupestres* is not only grossly understudied, but these areas also are under threat due to human activity. Hence, her proposed study of the *campos rupestres* is crucial to both a better global understanding of this region and to conservation efforts—her work has particularly broad implications.

As one part of her work (that described here in her proposal), Maria will use species of the genus *Begonia* as a model to better understand the patterns of distribution of species within the *campos rupestres*. Are species of *Begonia* in the same community more closely related than expected by chance (phylogenetic clustering) or distantly related (overdispersion)? Do diversification patterns suggest the *campos rupestres* served as a refugium during glacial periods? This work will have broad implications for better understanding the history and composition of the endangered *campos rupestres*.

Maria's total body of work is large in scope and interdisciplinary in nature and involves as a foundation a phylogenetic underpinning, plus big data analyses of thousands of points of plant distributional data, as well as large amounts of genetic data. On a broader scale she will use digitized herbarium specimen data available through aggregators such as GBIF for Brazilian species and a dated phylogeny that she constructs using DNA data. Using dated phylogenetic trees, she will assess areas of phylogenetic endemism and areas that have the most phylogenetic diversity. The results will be of enormous importance for evolutionary biologists, ecologists, and also of great conservation interest—her work will identify areas of conservation concern in the *campos rupestres*. That is, she will pinpoint those areas that contain the largest proportion of the plant tree of life. This will be of great importance to regional conservation planners. She will also model future plant distributions in these grasslands and conduct analyses of ecological forecasting—again, these data will be of broad biological and conservation interest. Her overall work will be a model for interdisciplinary studies that bridge phylogeny, ecology, and use big data to address major questions in biodiversity hotspots.

To conduct this important work in Brasil Maria must first conduct extensive field work. Maria is a native of Brazil, and hence is a perfect person for conducting this type of research in her home country. She also will be in a long-term position to help with biodiversity studies in Brazil.

Maria has excelled as both a student and a teaching assistant and is making great progress on her dissertation research. Moreover, she is very active in outreach efforts to the K-12 teaching and student community, Girl Scouts, and other members of the public. I strongly endorse this exciting project and promising student.



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