Discovery of a Potential New Genus in the Livstoninae (Trachycarpeae: Arecaceae)

The award enabled data generation of molecular sequences for phylogenetic analysis. The phylogeny unequivocally supported the recognition of a new genus of palms from Vietnam, *Lanonia*. A manuscript describing the results is in press at Systematic Botany (Henderson & Bacon 2011) and a manuscript describing biogeographic patterns in the subtribe Livstoninae is in preparation.

Amount awarded: $600.
Speciation Patterns of *Scaphosepalum* (Pleurothallidinae-Orchidaceae)

Initially the ASPT graduate student fund was going to finance part of my fieldwork in Peru, where two species of *Scaphosepalum* occur. The long process to obtain collecting permits and the vague locality information of one of the Peruvian species deter me from going but instead, I was able to obtain Peruvian material by purchasing plants from orchid growers in the United States. I used the ASPT graduate student research grant to extend my fieldwork in southern Ecuador where 14 species occur. The field season resulted in 76 specimens (herbarium, pickled flowers and tissue) that increase the sample size by adding variations of species previously not represented in my dataset and, I was also able to find other closely related species that are currently been used as outgroups. Visiting more localities was also important since I was able to generate more spatial information that will be used in the biogeographical portion of my project. I am currently analyzing molecular data and collecting additional morphological data that resulted from the fieldtrips. The preliminary results support the early predictions based on morphological characters only, that *Scaphosepalum* is not monophyletic and it also supports the paraphyly of the widespread species *S. swertiifolium*.

Amount awarded: $600.
Naomi Fraga  
Department of Botany  
Claremont Graduate University and Rancho Santa Ana Botanic Garden

Conservation, Taxonomy, and Reproductive Biology of the  
*Mimulus palmeri* clade (Phrymaceae)

With the funds I was granted by the American Society of Plant Taxonomists I was able to conduct field work in California and Nevada and make significant progress on sequencing DNA from three non coding chloroplast regions (*petA-psbJ, psbD-trnT, rpl32-trnL*). Three undescribed species that were previously misidentified as *Mimulus palmeri* (Phrymaceae) were revealed during field work conducted in 2010-2011. As a result I am working to describe five species of *Mimulus* that have been identified over the course of my dissertation research. Sequence data I have generated and analyzed thus far, support my hypothesis for more exclusive partitioning of species diversity. In the next academic year (2011-2012) I plan to finish gathering sequence data for the species phylogeny, and initiate gathering fragment data for a phylogeographic study of four closely related *Mimulus* species in the southern Sierra Nevada, California. My expected completion date is December 2012.

Amount awarded: $600.
Investigation of the Molecular Phylogeny and Morphology of *Caesalpinia* (Fabaceae) Sensu Lato

The ASPT Graduate Research Grant assisted me in conducting a 3 week internship in September 2010 at Kew Botanical Gardens, with Dr. Gwilym P. Lewis, head of the Herbarium Legume Section. I acquired greater knowledge about the morphological characters that define the different genera that I have so far identified in my molecular phylogenies of *Caesalpinia* s.l. (Fabaceae). The internship served to give me the bases I needed to develop a matrix of morphological characters that will help determine the various genera we think exist in *Caesalpinia* s.l.

My stay at Kew also allowed me to study and identify herbarium specimens of interest for future morphological studies. My research project is still ongoing, but as a result of my internship at Kew, I was able to establish an outline for a scientific article on the phylogeny of *Caesalpinia* s.l., based on four chloroplastic markers, the nuclear ribosomal marker ITS, and a matrix of morphological characters.

Amount awarded: $600.
Enhancing the Molecular Phylogeny of Amaryllidaceae tribe Hippeastreae

I used the funds awarded to me by ASPT in two aspects of my research. First, half of the money was donated to my advisor's lab, the Soltis lab at the Florida Museum of Natural History, to pay part of the expenses involved in amplifying and sequencing the ITS region for additional taxa of Amaryllidaceae tribe Hippeastreae. The results obtained by the phylogenetic analysis of this expanded ITS matrix were presented this year in the International Botanical Congress at Australia and in the Botanical Society of America meeting at Missouri, where the support given by ASPT was acknowledged. The remaining half of the money was used to finance a two-weeks stay at Miami to work in Dr. Alan Meerow's lab at USDA-ARS-SHRS which was focused on the optimization of WRKY loci as phylogenetic markers in my group of study. Though my work with the single optimized WRKY locus is ongoing, I plan to start working soon with additional low-copy nuclear genes. This task will be much easier now that I have a previous experience dealing with this type of molecular markers thanks to the funds contributed by ASPT.

Amount awarded: $600.
Correlated Diversification of Vascular Plants and their Associated Mycorrhizal Fungi – A Case Study

The funds from the William R. Anderson Graduate Student Research Grant were used to help fund a plant collecting trip to the Canary Islands and the Azores in summer 2010. During this trip, leaves and roots of over 15 species of the plant genus *Tolpis* (Asteraceae) were collected. The leaf material has since been utilized to infer the phylogenetic relationships between *Tolpis* species in Macaronesia, while the root samples have been studied on a metagenomic basis, characterizing the mycorrhizal fungal diversity contained within them. Phylogenetic and metagenomic data are currently analyzed, testing several hypotheses of correlated diversification between these plants and their symbiotic root fungi.

Amount awarded: $1,000.
Investigating the Paradox of Genetic Variability in Apomictic Lineages:
A Case Study in Desert-Adapted Ferns

The funds awarded to me by the ASPT have been used to obtain specimens necessary to document patterns of genetic variability in desert ferns, specifically in triploids from the genus *Cheilanthes* (Pteridaceae). In addition to obtaining collections, these funds have also supported the ongoing development of microsatellite markers that will be used for genotyping, as proposed in this study. My investigations are currently ongoing and I look forward to analyzing data during the spring and summer (2012). Lastly, I am grateful for the funds supplied by ASPT; this award has significantly bolstered my study.

Amount awarded: $1,000.
Phylogenetic Relationships and Ecological Speciation in the Popcorn Flowers

(Plagiobothrys, Boraginaceae)

Using funds from the ASPT Student Research Grant, I have nearly completed the molecular dataset for the phylogenetic component of my dissertation research, which focuses on the evolution of the genus Plagiobothrys (Boraginaceae). At the time of the proposal to ASPT, I had fairly broad sampling of the genus in North America for one region of the genome (ITS). With the generous support of ASPT, I have been able to add to my dataset broad sampling of the ETS region as well as targeted sampling from three chloroplast regions. I have also greatly increased the overall taxonomic representation of the study group by including additional samples from North America as well as samples from a number of South American lineages. This phylogeny has allowed me to examine broad biogeographic patterns among Plagiobothrys and close relatives in the Cryptanthinae, the subject of my most recent talk at Botany 2011 in St. Louis.

Amount awarded: $750.
Species-Level Systematics in Lantaneae (Verbenaceae)

The ASPT graduate research award helped me travel to Brazil to conduct fieldwork in collaboration with Brazilian botanists. The specimens we collected have allowed me to greatly expand my taxonomic and geographic sampling in order to infer a representative phylogeny for Lantaneae. Additionally, I was able to sample Brazilian members of the Lantana camara species group, which will be vital to untangling the evolutionary history of this complicated lineage. Thanks also to a travel grant via the ASPT, I was able to present the preliminary results of my ongoing research project at the International Botanical Congress earlier this year. The first broad and well-resolved phylogeny of Lantaneae will be published as part of these symposium proceedings in 2012.

Amount awarded: $600.
Systematics and Evolution of Andean Ferns in the genus *Polystichum* Roth (Dryopteridaceae)

Funding from ASPT was used for travel to Ecuador and Bolivia to collect specimens of the fern genus *Polystichum* Roth (Dryopteridaceae). I am currently analyzing the DNA extracted from these specimens but preliminary results suggest at least one of the specimens collected is a new species. In addition the funding enabled me to find morphological variants from a broader geographic sampling, thus, improving our understanding of the group’s species boundaries and historical biogeography.

Amount awarded: $600.
Building a Phylogenetic Framework for *Cryptogramma* (Pteridaceae)

As a result of receiving ASPT funding, I have been able to generate plastid and nuclear sequence data for multiple accessions of 12 species of *Cryptogramma* (Pteridaceae) and related genera. I am currently analyzing these sequence data and have been able to confirm the monophyly of *Cryptogramma* and its two sections. Additionally, I have been able to identify the parentage or closest relatives of two polyploidy taxa. *Cryptogramma crispa*, a tetraploid species from Europe, is most closely related to the American diploid *C. cascadensis*, although it remains unknown if *C. crispa* is an allopolyploid formed in part by *C. cascadensis* or if *C. crispa* is an autopolyplod that displaced its diploid progenitor. Additionally, *C. acrostichoides* has been confirmed as an ancestor of the tetraploid *C. sitchensis*. These data are being used as the foundation of a new study analyzing the phylogeography of *C. acrostichoides* and *C. sitchensis* following the Last Glacial Maximum in North America.

Amount awarded: $600.
Phylogeography of *Nassauvia glomerulosa* (Asteraceae, Nassauvieae)

The ASPT Graduate Student Research Grant awarded was used to travel to the Plant Systematic Laboratory of the Brigham Young University in Provo, Utah, for three months during 2010. I worked with Dr. Leigh Johnson personally, and there were also opportunities for me to work and visit with other students and faculty at Brigham Young University. It was a great chance for me, academically, to expand my skills and a great opportunity to experience a different culture. In the laboratory, I isolated DNA from samples of *Nassauvia glomerulosa* and related species, amplified one nuclear and two chloroplast genes via PCR, obtained sequences of those regions, and also worked on data analysis of the resulting sequence matrices. The latter was especially rewarding because I was able to learn Niche Modeling and other analyses that have enabled me to take my research in a new direction. I am presently preparing this data for publication. I am very grateful for the support from ASPT that contributed part of the flight tickets from Argentina and made my experience in the USA possible. Thank you so much.

Amount awarded: $600.
Lachezar A Nikolov
Department of Organismic and Evolutionary Biology
Harvard University

Comparative Floral Development of Relatives of Rafflesia (Rafflesiaceae)

The basic floral biology of Rafflesiaceae, plant holoparasites that spend their vegetative state inside the host tissue and produce the world’s largest flowers, remains poorly understood. This project aims to describe the developmental morphology of their flowers, from their humble beginnings as a mycelium-like endophyte thread to the remarkable, malodorous and flesh mimic bloom reaching one meter across at anthesis. We have employed traditional light and electron microscopy, as well as cutting-edge synchotron tomography to characterize various developmental stages of all three genera in the family. We have suggested potential homologies of the floral organs of Rafflesiaceae, shed light on the identity of the perianth whorls and characterized the multilocular anthers and the puzzling, controversially interpreted labyrinthine ovary present in the family. Work in progress relies on a broader sampling of developmental stages and outgroup comparisons to get a clearer picture of the gynoecium and androecium development in the group, and to look for potential synapomorphies between Rafflesiaceae and their tiny-flowered relatives in the spurge family.

Amount awarded: $600.
The 2010 Research Grant for Graduate Students was used to support a collection trip to Colorado, Nebraska and Wyoming in May 2010. Funds were used for flight, car rental and camping accommodations. I collected approximately 125 specimens of 3 genera (Chara, Nitella and Tolypella) belonging to Characeae. I collected 30 specimens of 3 species in Tolypella, and these included *T. boldii*, *T. glomerata* and *T. intricata*. The collection of *T. boldii* was especially significant as it expands its range from its only known locality in Texas. Additional funds from other sources were used for data generation and analyses. My research on the genus *Tolypella* is ongoing, as I will continue to collect in Europe next year. However, in spring 2012 I plan to publish my findings on a phylogeny of North American *Tolypella* species.

Amount awarded: $600.
Taylor Sultan Quedensley  
Section of Integrative Biology  
The University of Texas at Austin

Phylogeny of the *Roldana*-Clade (Asteraceae: Senecioneae)

Funding from this grant coupled with other funding sources enabled me to complete an extended collecting trip to Central America and Mexico. During this research visit, a new species was collected in my research group, along with dozens of other species that have directly contributed towards the completion of my dissertation research. Presently, I am writing my dissertation and I plan to graduate in April, 2012.

Amount awarded: $600.
Title of Study: Phylogenetics of Argythamnia sensu lato (Euphorbiaceae)

The funds from ASPT were used to pay for sequencing service from Macrogen, Inc. I obtained approximately 30 sequences of Argythamnia species (ITS and trnL-F). This greatly helped my Master research project, and I graduated on time from the Universidad Michoacana de San Nicolás de Hidalgo, Mexico in April of 2011. I am currently preparing the manuscript to submit for publication. It also will help with my long-term goal of producing a detailed monograph of subg. Ditaxis.

Amount awarded: $600.
My award was used to pay for a field trip to collect several species of *Dryopteris*, the woodferns, in the field. There are thirteen species of this genus in North America, and nine of them are recognized as forming a classic case of reticulate evolution. This complex includes diploids as well as allotetraploids and an allohexaploid, and my PhD dissertation research involves untangling the relationships among these species. I travelled to several states, including Michigan, South Carolina, North Carolina, and New York, to locate these taxa in the field and collect them for DNA analysis, and this award from the American Society of Plant Taxonomists supported that travel. I am currently analyzing the DNA sequence data obtained from the plants I collected, and they have allowed me to identify confidently the parents of the allopolyploids in this group of ferns.

Amount awarded: $750.
Michelle Smith  
Department of Ecology and Evolutionary Biology  
University of Tennessee - Knoxville  

Molecular Evolution in the Appalachian *Asplenium* Complex (*Aspleniaceae*)  

My research project is ongoing. I am currently analyzing my available data and learning computer programming in the process. ASPT funds were invaluable in helping me collect approximately 70 additional ferns, including several triploids and six specimens of the tetraploid *Asplenium pinnatifidum* throughout its range in the eastern United States, with a focus on sites in Kentucky where I was the most successful in finding my ferns. I still need to find a few more localities for the diploid *A. montanum*, as it seems that this fern is now found in more restricted habitats than previously described from my herbarium database. I was also able to use ASPT funds to attract an undergraduate volunteer to work on my project, and am currently training her in molecular techniques.

Amount awarded: $600.
Simon Uribe-Convers  
Forest Ecology and Biogeosciences Department,  
University of Idaho - Moscow

Phylogenetic Analysis of the Genus *Bartsia* L. (Orobanchaceae):  
Increasing Sampling of a Mostly Andean Genus.

I used the grant awarded by ASPT to travel last summer for a month to Colombia and collect 80 specimens of *Bartsia* (Orobanchaceae). Among these specimens there is a potential new species from a páramo located in the eastern cordillera of Colombia. These collections have been used to infer the phylogenetic relationship of the group, as well as their biogeographic patterns, divergence times and diversification rates. My research using these collections is completed and is about to be published. Additionally, I’m using these samples to implement a novel bait-capture next generation sequencing method.

Amount awarded: $750.
Canary Grasses (*Phalaris*, Poaceae): Phylogenetic Relationships, Chromosome Evolution, and Patterns of Geographic Distribution

The funds from the ASPT Graduate Student Research Grant were used to generate DNA sequence data to reconstruct the first phylogeny for the genus *Phalaris* (Poaceae). The phylogenetics portion of my project is complete and I will now focus on chromosome evolution and biogeography. I was able to include more accessions of each species thanks to the funding I received.

Amount awarded: $600.
Colby Witherup
Department of Plant Biology and Conservation

Measuring and preserving diversity in a Bangladeshi food crop:
Artocarpus heterophyllus (Jackfruit, Moraceae)

I traveled to Bangladesh in Summer 2010 and completed three weeks of field work. Lab work was completed Summer 2011. I am currently completing data analysis and writing up my work for publication. The ASPT grant funded my travel within Bangladesh to my field sites and a digital sound recorder that allowed me to record data collection and interviews with tree owners. It also funded tree tags that will benefit my research and the research of my Bangladeshi collaborators by matching the genetic fingerprinting I processed in the lab to future morphological measurements and studies.

Amount awarded: $1,000.
The funds I received from the ASPT Graduate Student Research Grant allowed me to travel to the Royal Botanical Gardens, Kew, where I worked with a specialist in legume floral ontogeny. Together, we spent four weeks taking scanning electron micrographs of my specimens at varying points in their floral development. During my time abroad, I learned the use of the scanning electron microscope, microdissection techniques, and interpretation of the images I captured. I was also able to study Kew Gardens’ extensive collection of herbarium vouchers for my taxon of interest, aiding in my parallel study of their mature morphology. My research project is ongoing, and the images I obtained are currently being analysed for use in a future publication.

Amount awarded: $750.