

## **FACULTY RESEARCH FUND**

**Award Date:** Spring 2016

**Proposal Title:** Exploring Ectosymbioses: Warblers and their Feather Mites

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**ABSTRACT.** Symbiotic relationships between organisms are often specialized and can lead to isolation of populations, speciation, and even co-evolution of the organisms involved. However, this process is varied and unresolved in many cases. One symbiotic system that has only recently been explored is that of birds and feather mites. Feather mites are obligate avian ectosymbionts that feed on various chemicals secreted by a bird's uropygial gland, but beyond this basic biology, little is known about the relationship. There is general uncertainty regarding what type of symbiotic relationship exists between feather mites and their host and the level of co-speciation that occurs in this system is virtually unknown. Perfect concordance of, or symmetry between, phylogenies would indicate that feather mites and their avian hosts

co-specified together. Co-speciation may be expected to occur in a host-feather mite system because feather mites have limited dispersal abilities, which can separate populations reproductively (and mites may also evolve specialized diets that correspond with only one avian host). Alternatively, discordant phylogenies between hosts and mites may be the result of events such as symbiont duplication, extinction, and host-switching. In this study, I propose to test the hypothesis of fine scale co-speciation (perfect concordance) between feather mite phylogenies and the phylogeny of one avian Family (Parulidae).

Parulids are interesting host models for this work because of their relatively rapid diversification followed by long evolutionary independence, diverse life histories and distributions, recently reconstructed phylogeny, and because they are regular hosts to various taxa of feather mites. To test this hypothesis, we will construct phylogenies of three lineages of feather mites that are found on warblers (genera spread across Parulidae) and then test for concordance with a recently reconstructed phylogeny of New World Warblers. This research will be conducted with collaborators from AState, U of Arkansas, and U of Alberta.