Project Summary

Sexual selection in birds has resulted in many elaborate and extraordinary plumage characteristics, from the peacock’s famous train to the spectacular red coloration of the male cardinal. Sexual selection has also influenced behavior, including vocal learning of complex song. In most cases in birds, it is the males that develop obvious secondary sexual characteristics, and in many Passerine taxa, including the Emberizine Sparrows, only males regularly sing. Therefore, song learning and acquisition has been studied almost entirely from the perspective of the male. The process of song learning in male birds is complex and varies significantly by species, but in general, seems to proceed in several fairly distinct stages. The first is a sensitive phase, during which young birds select and memorize species-specific template songs from their environment. During later stages, they will process, practice, perfect and modify these songs, eventually performing only a subset of those they acquired during the sensitive phase. Much research has been devoted to teasing out the timing and development of this process, however, this reveals only half the puzzle of this sexually selected signal. The cognitive processing of song in female birds during the first few months after hatchng is still largely unknown. While males generally display sexually-selected traits, female preference is one of the main drivers behind the development of these characteristics in the males. Therefore, the development of female preference for male traits is, ultimately, of perhaps greater importance to the study of sexual selection than the development of the traits themselves, albeit often more challenging to quantify. Presumably, there is also a sensitive phase in female birds, although what information is processed during this time is not clear. The main goal of this project is to determine the extent to which female Swamp Sparrows (*Melospiza georgiana*) must learn to recognize, versus innately prefer, conspecific songs.

Summer Work

To measure the role of learning versus innate preference, it was necessary to remove hatchling female Swamp Sparrows from the wild before they had the opportunity to observe and potentially learn from adult females. Between June 3rd and July 5th, 8 nests and a total of 32 birds were collected and brought into the laboratory, allowing us to hand-rear the birds from a young age (around 3-5 days old, well before the start of the sensitive phase). Hand-rearing was an intensive effort which required nestlings to be fed with a syringe every 45 minutes, for approximately 15 hours per day. As birds became more independent, mealworms and seed were gradually introduced, and hand-feeding steadily decreased until birds no longer accepted food from the syringe. Before beginning the song-tutoring phase of the experiment, a molecular sexing procedure was used to differentiate males and females; males were separated to participate in a concurrent study on signal degradation and artificial tutoring strategies. Birds
were entered into the tutoring phase of the experiment at around 27-30 days of age. Females were exposed to several different recordings of both Song and Swamp Sparrow songs, which were randomly shuffled each day, and played at a constant volume. Their vocalizations in response to the songs were recorded, and after training is completed, can be quantified to assess their interest level in conspecific songs versus those of a related species. Males were exposed to Swamp Sparrow songs only, and some recordings were paired with a visual stimulus of a male Swamp Sparrow singing. Control recordings were paired with a moving image of a local swamp where these sparrows are known to nest. The males were videotaped during song tutoring, which lasted for approximately 1 hour each day for both sexes. Analysis of the audio and video recordings taken during tutoring is ongoing. Final results will not be available until the following spring, which would be the first breeding season for Swamp Sparrows hatched this year. At that time, it will be possible to analyze both male song learning and female preference for conspecific songs. Data collected in subsequent years will also potentially provide interesting information on the degree to which songs and preferences vary over the lifetime of a bird.