Title: Song Rhythm Development in Zebra Finches
By Julia Hyland Bruno

This dissertation investigates song-rhythm learning in songbirds. Songbirds have been studied extensively in mechanistic investigations into the sensorimotor underpinnings of the cultural transmission of learned vocalizations. While several studies identified forebrain song-system neurons that generate rhythmic song patterns, we know little about how song rhythms are learned. The first part of the dissertation describes methods for detecting and analyzing birdsong rhythm patterns, and demonstrates their utility for identifying the role of song rhythms in social interactions. Results suggest that rhythm plasticity in zebra finch song may provide a potential vehicle for communication. Controlled song-learning experiments further found that developing zebra finches more readily incorporated a new song element when the tutored rhythm was unchanged, suggesting that a rhythmic framework is established during song learning. An updated schema of the song imitation process is proposed which situates sequence learning within a rhythmic framework. Finally, the role of striatal dopamine in song-mediated social cohesion in zebra finches was identified. Taken together, the dissertation's findings lay a foundation for future explorations of rhythm in vocal learning and communication.