Evolution of communication system is seemingly complex requiring coevolution between sender and receiver mechanisms. Studying acoustic communication in the katydid genus Neoconocephalus (cone-headed katydids), I compare traits between individuals and across species looking at patterns of evolution and origins of novel traits.

There are three lines of male call trait divergence in Neoconocephalus. Combinations of these traits make species specific call phenotypes, typically matching with female preference for calls. Each novel male call trait has many independent evolutionary origins. Even more excitedly, preliminary studies of female preference for male call traits suggests that the evolutionary history is even more diverse with many different recognition systems forming similar preferences.

Based upon comparative methods it appears that communication traits in Neoconocephalus are pliable, easily turned on and off, subject to drift, female preferences are very diverse and male calls seem limited to a few traits.

Seven of the ten species of Neoconocephalus found in North America are closely related sharing a single common ancestor. Species in this clade represent all the diversity in acoustic communication found in the entire genus. I propose that this diversification is the result of an adaptive radiation triggered by the extreme ecological opportunity following the last glacial maxima.

Molecular-clock analysis revealed that the diversification in this clade occurred in a single glacial cycle. In fact, this adaptive radiation occurred 11 thousand years ago. Previously the most rapid arthropod diversification event known occurred in Hawaiian Laupala crickets five million years ago. I found that temperate Neoconocephalus species were radiating into North America out of tropical grasslands at the same time that humans were entering North American by crossing the Bering Straight.