Although speakers have implicit knowledge of phonological trends across the words of their lexicons (Ernestus and Baayen 2003, Hayes et al 2009, et seq.), in many cases individual items behave idiosyncratically (Zuraw 2016). During acquisition, the learner must memorize details about each word, at the same time as using those words to learn a phonological grammar.

In this talk, I present a computational model that simultaneously learns the idiosyncratic properties of words and phonological generalizations over them. Features of a lexical item (e.g. stress pattern) are represented with continuously-valued weights, simulating the memory strength associated with each feature of a word. These features replace traditional faithfulness constraints, competing with markedness constraints to determine the realization of a word. I test this model on two data sets: corpus data of English comparatives ('more happy' v. 'happier'), and toy data representing a typology of stress systems with varying degrees of exceptionality. Under psychologically plausible assumptions about the learning process (more exposure to frequent words, memory decay for less frequent words, e.g.), frequent lexical items emerge as more idiosyncratic than infrequent items. On the other hand, when a feature is completely predictable from the grammar, the model will fail to store it on individual lexical items. Small numbers of exceptions lead to intermediate ability to store a feature. These results are consistent with experimental and corpus evidence. For example, data on stress deafness shows that small numbers of exceptions lead to intermediate ability to store a feature, in Peperkamp et al., 2010.