Automatic Speech Recognition (ASR) has achieved its state-of-art performance using mainly statistical methods. Although current algorithms succeed under relatively undisturbed conditions, further improvement for casual speech recognition is hindered by the indeterminacy introduced by “non-standard” speech productions (better expression?). Motivated by evidence that human speakers identify phonemes by detecting specific sound patterns that indicate linguistic categories or “acoustic cues to distinctive features”, the Speech Communication Lab studies these cues for the purpose of constructing a better acoustic model for ASR. This project aims at modeling the correlation between the variations of the cues and the corresponding speaking context, such as syllabic (phonetic?) structure of spoken phrases and presence of breaks or accents in casual conversations. Translating the correlation into additional constraints in the speech recognition process, this model, in combination with effective distinctive feature detection programs developed in our lab, is expected to constitute a new ASR system with greater robustness under casual settings.