



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Xiaozhe Shi	Project Number S0319
Project Title Human Speech Component Analysis	
Abstract Objectives/Goals This project's purpose is to explore the components of speech perception, to answer the question #What do humans actually hear when they listen to speech.# This project was done to add more to the speech knowledge base and research methods for speech recognition. Methods/Materials A speech component analysis experiment was conducted. In this experiment, voice samples were filtered so pitch, power, and relative frequency compositions are separated into different samples. The experiment consisted of a multiple choice accuracy of perception test. Results The statistical analysis shows that the fundamental pitch and the relative power of the sound failed as a medium of communication, but the relative pitch compositions allowed subjects to discern almost half of the phrases. Conclusions/Discussion The data supports the original hypothesis. Relative compositions contain much more discernable audio information in relation to speech. The information collected in this project may be used for further speech research. Future algorithmic speech recognition research based on relative harmonics should be conducted.	
Summary Statement This project uses computer science and human tests to determine what basic component of sound is interpreted into speech.	
Help Received Professor He Yingmin and his student Wang Xiujun, in China, helped me with the computer science part of extracting fundamental pitch; Professor Joe Pasquale helped me brainstorm project idea and proposal; Intel helped with a 500\$ scholarship grant.	