



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Tanooj Luthra	Project Number S1315
Project Title Adaptive Signal Processing for Optimal Wireless Networking	
Abstract Objectives/Goals A major problem in a wireless networking system is that interference hinders the speed and distance of a network connection. This interference originates from a variety of sources including common household objects such as cordless phones, microwave ovens, and even the neighbor's home networking system. This project is centered on adaptively removing a significant amount of interference and thus improving the effectiveness of wireless networking. Methods/Materials A new fast adaptive algorithm is developed and exploits the fact that the signals received from the direction of a desired source and the direction of an interferer have different characteristics across the antenna phased array. Using this to my advantage I created two virtual antenna arrays and added their output such that only the interference is removed while the desired signal is preserved. I wrote a computer program using C programming language to simulate and characterize my algorithm. Results The software simulation shows that by using my new algorithm the distortion in the signal due to the interference decreases on average by more than a factor of 100 when compared to the conventional method. As shown in several graphs and tables, the algorithm adaptively nulls out the distortion regardless the location of the interferer while remaining equally effective for these various locations. Conclusions/Discussion The high interference rejection allows a significant reduction in bit errors and thus increases the speed of a wireless network. It also allows preservation of the signal quality over greater distances, and therefore expanding the range of a wireless network in the presence of interference.	
Summary Statement To significantly increase the speed and distance a wireless network by adaptively reducing the interference.	
Help Received Mother helped put board together; Father helped gather books and background information	