# CALIFORNIA STATE SCIENCE FAIR
# 2005 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**J0217**

**Project Title**
## Wimshurst Influence Machine

**Abstract**

**Objectives/Goals**
To first build a reproduction of an 1883 Wimshurst Influence Machine that would produce static electricity without the use of friction. Secondly, to improve on the design of the machine through experimentation.

**Methods/Materials**
I had a desire to build a copy of a machine that produced static electricity not using friction. I found an article in an encyclopedia dated 1912 that said this machine could easily be built.(It wasn't). I thought the Wimshurst Influence Machine, a machine developed by James Wimshurst in 1883, would be fun and interesting to build.
My machine was built according to the original plans with unvarnished natural wood and exposed brass and metal parts. This machine did produce a faint spark between the discharge terminals. However, I believed that through experimentation and research I could make improvements to my original Wimshurst machine. I wanted the machine to produce a spark that would jump a wider distance between the discharge terminals and one that would be bigger,and louder.
Over a three month time period I made modifications to the sectors, replaced the brass collector combs with brushes, used smaller diameter brass rods, and made and experimented with a variety of sizes of discharge terminals. I also varnished all wooden parts and used shrink tubing on every other part possible to eliminate leakage into the atmosphere, especially on humid days. The first Leyden Jars I made did not work very well due to the aluminum foil being too close together. I double insulated the Leyden jars to prevent shorting between the two layers of aluminum foil.

**Results**
Because of these modifications, when this machine is operating a person can see an intense white and blue static spark that jumps 1 1/2" between discharge terminals. He or she can even hear the loud snapping sound of that static spark. If the spark or some parts of the machine are touched, a person can feel a static shock and even smell the spark's discharge or the chemical transformation of the oxygen of the air into ozone.

**Conclusions/Discussion**
In conclusion, insulating the wood and metal parts allowed me to greatly improve the spark produced by my Wimshurst Influence Machine. Changing the surface area of parts and double insulating the Leyden Jars also allowed the original machine to work even better.
This machine is a very good aide for showing static electricity which will amaze and astound.

**Summary Statement**
To build a reproduction of an 1883 Wimshurst Influence Machine that would produce static electricity and to improve upon the design of that machine through experimentation.

**Help Received**
Dad provided supervision and built the most difficult parts; I drew up plans and had other parts made by a machine shop, many parts were bought off the shelf; Dad supervised me while I cut and drilled wood frame, routered corners, varnished wood, and used the torch to heat parts.