



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Jordi Bertran	Project Number 34613
Project Title Improving Child Safety with Biometric Identification	
Abstract Objectives/Goals Modern technology has always been a part of my life and I wanted to learn more about biometrics and how they can be applied to weapons in the armed forces and child safety. The number of children involved in accidental gun deaths has been increasing. The armed forces are constantly saving lives of millions of Americans and fighting for our freedom. In many cases, they use guns to defend themselves. If an American gun is to be stolen, or taken away from a soldier, the other person may have the power to shoot the weapon. In both of these cases, a smart-gun would solve the problem. With a smart gun, unauthorized users would not be able to fire the gun. Methods/Materials For my science project, I use two toy guns, a fingerprint sensor, C# programming language to program my biometric gun software, and many other materials in the process of my experiments. First, I programmed my gun software for the fingerprint sensor. Next, I disassembled the toy gun and placed the fingerprint sensor inside, connected to a USB cable to the computer. Then, I re-assembled the gun with the fingerprint sensor inside. I tested my fingerprint in many different ways; clean, dirty, sandy, and soaking wet. I tested the sensor with an unauthorized user many times as well. Results I performed 579 tests. I tested my clean fingerprint 296 times, dirty fingerprints 143 times, soaking wet fingerprints 40 times, and unauthorized user 100 times. With clean fingerprints, my print was identified 100% of the time, in an average of 1.6 seconds. With dirty fingers, the fingerprint was identified 73% of the time. With soaking wet fingers, the fingerprint was not able to be identified, but with a wipe of the fingers on clothing, the print was then identified 100% of the time. Conclusions/Discussion According to my results, a biometric smart gun would be able to recognize the gun owner and be able to prevent any unauthorized users from firing the weapon.	
Summary Statement The goal of my project was to create a smart gun that could detect the fingerprint of the owner and prevent unauthorized users from firing the weapon.	
Help Received Thanks to my parents for purchasing the toy guns on Amazon, for my father for providing me with the fingerprint sensor. Thanks to my science teacher Mrs. Hunker for all of her guidance.	