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*Biometric Electromechanical Firearm Safety*

There are at least 310 million firearms in the private sector of the US today. However, in the wrong hands, these weapons have unintended and catastrophic effects. For example, the number of preschoolers who were killed by firearms in 2008-9 is double the number of law enforcement officers who died in the line of duty during that same period, and the number of firearm-caused injuries in teens has doubled in the last 7 years.

Here, I provide a solution to this issue with a system that allows only registered users (e.g. parents, not children) to fire a firearm. Given that more than 17% of police-related deaths result from officers being disarmed in combat, this system also ensures that the weapon cannot be used against them.

This engineered system uses biometric fingerprinting to uniquely identify a user and lock or unlock the firearm. This system is both electrical and mechanical, combined to create a functional system transparent to an authenticated user. The designed electrical system receives input from the fingerprint sensor to determine a user's identity. If the identity matches, the electrical system drives a small piezo motor that actuates the mechanical design that locks or unlocks the firearm with a pin through an essential part of the firing mechanism.

I designed the PCB for the electrical system using a CAD package and assembled it. I designed the mechanical system and display model using another CAD package and produced using additive rapid prototyping techniques including Stereolithography and Digital Metal Printing.