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TRIGGERED: MASS SHOOTINGS, SMART GUN TECHNOLOGY AND THE  
SEARCH FOR SOLUTIONS

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**I. Introduction**

April 2, 2018.<sup>2</sup> Five teenagers are featured on the cover of TIME magazine.<sup>3</sup> They stand for unity of a generation.<sup>4</sup> They stand in defiance of preventable national tragedies.<sup>5</sup> They stand for one, clear message: Never Again.<sup>6</sup> America has more guns than people.<sup>7</sup> Gun violence plagues this country, however, guns remain among the least regulated type of property.<sup>8</sup> In certain jurisdictions, legally obtaining a gun is easier than getting a driver's license.<sup>9</sup> Yet, five teenagers, as representatives of an entire generation, are thrust into the spotlight.<sup>10</sup> Why now, are their voices being heard?

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<sup>2</sup> See Charlotte Alter, *The School Shooting Generation Has Had Enough*, TIME MAG. (Mar. 22, 2018), archived at <https://perma.cc/3CMP-V48J> (listing the publication date of Time Magazine which features student organizers from Parkland, Florida).

<sup>3</sup> See *id.* (describing the story of the student organizers who are actively fighting for stricter gun control).

<sup>4</sup> See *id.* (explaining that the student organizers stand as a representation of a generation that has seen and experienced a society which mass-shootings occur frequently).

<sup>5</sup> See *id.* (noting that these students have become “central organizers” of what could become “the most powerful grassroots gun-reform movement in nearly two decades”).

<sup>6</sup> See *id.* (outlining the hashtag that organizers are using to march in the streets in protest for stricter federal gun control regulations).

<sup>7</sup> See Christopher Ingraham, *There Are More Guns than People in the United States, According to a New Study of Global Firearm Ownership*, THE WASH. POST (Jun. 19, 2018) archived at <https://perma.cc/LY56-KM8N> (enumerating statistics of global firearm ownership and comparing the population of the United States of America to the number of firearms owned).

February 14, 2018.<sup>11</sup> A 19-year-old student steps out of an Uber in Parkland, Florida with a black duffle bag and a backpack concealing a legally purchased assault rifle and ammunition.<sup>12</sup> He walks into Marjory Stoneman Douglas High School and fires the weapon, systematically murdering 14 of his fellow students and 3 of his faculty members.<sup>13</sup> In the days and weeks following the shooter's arrest, the students of Parkland rose up together in solidarity to advocate for increased regulations on firearms.<sup>14</sup>

October 1, 2017.<sup>15</sup> On the 32<sup>nd</sup> level of the Mandalay Bay Hotel in Las Vegas, Nevada, 23 high-powered firearms strewn on the floor.<sup>16</sup> Below, fifty-eight people are dead, and over 500 are injured.<sup>17</sup> Each weapon was purchased legally, including the revolver that the shooter used on himself after he carried out the most devastating modern mass shooting in the United States of America.<sup>18</sup> None of the

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<sup>8</sup> See Tessa Stuart, *7 Things that Are Harder to Get than an Assault Weapon*, ROLLINGSTONE (June 14, 2016), archived at <https://perma.cc/ZX3P-UXSW> (listing seven items with more stringent regulations than assault weapons: abortions, driver's licenses, solar panels, voter registration cards, exotic animals, marriage licenses and handguns).

<sup>9</sup> See *id.* (noting that, at the time of the article, Florida did not require a permit or license to purchase or carry an assault rifle). The process for a driver's license in Florida is providing a birth certificate or passport, proof of a Social Security number and two forms of proof of address. *Id.* Additionally, there is a mandatory four-hour Traffic Law and Substance Abuse Education class, a written test, a driving test and a log of 50 hours behind the wheel, ten of which must be at night. *Id.*

<sup>10</sup> See Alter, *supra* note 2 (featuring five teenagers and describing their opinions about gun violence and ways they intend to curb that violence).

<sup>11</sup> See Julie Turkewitz, Patricia Mazzei, & Audra D.S. Burch, *Suspect Confessed to Police that He Began Shooting Students 'in the Hallways'*, N.Y. TIMES (Feb. 23, 2017), archived at <https://perma.cc/Y2JE-B888> (discussing the known timeline of events and potential motivations in the aftermath of one of the most brutal American School shootings in modern history). The accused's biological mother had passed away over a year prior and the man who took 17 lives in Florida was a self-proclaimed school shooter, such as social media posts and tips to the Federal Bureau of Investigation. *Id.*

<sup>12</sup> See *id.* (describing the 2018 school shooting where 17 people were killed). The article describes the methods that the shooter used to transport to the school, namely in an Uber. *Id.*

weapons that were used in this mass shooting were smart guns; even if they were, fifty-eight people would still be dead, over 500 would still be injured, and Stephen Paddock would still go down in history as the man who covertly planned and executed the bloodiest mass murder in this country to date.

November 5, 2017.<sup>19</sup> David Kelly walks into the First Baptist Church in rural Sutherland Springs, Texas.<sup>20</sup> He leaves the house of worship with 26 church members dead in his wake and 20 wounded.<sup>21</sup> Kelly used a semi-automatic assault rifle.<sup>22</sup> These three incidents, although close in time and similar in result, were different in many ways.<sup>23</sup> The one commonality: each tragedy featured destructive weapons that were not smart guns.<sup>24</sup>

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<sup>13</sup> See *id.* (articulating the statistics and backgrounds of the victims on the Parkland, Florida school shooting that sparked a large student-run movement and rigorous debate on gun control).

<sup>14</sup> See *id.* (noting the students' cries for help were also directed at President Trump and begged him for action on gun control).

<sup>15</sup> See Rick Jervis & Kevin Johnson, *What Guns Were Used in the Las Vegas Shooting?*, USA TODAY (Oct. 3, 2017), archived at <https://perma.cc/DX2D-XVYS> (outlining the layout of the room that Stephen Paddock used when he carried out the 2017 Las Vegas Shooting).

<sup>16</sup> See *id.* (stating each weapon found at the scene of the Las Vegas Shooting as unmodified with the exception of "bump stocks").

<sup>17</sup> See Turkewitz, *supra* note 11 (providing fatality and injury rates from the 2017 Las Vegas Shooting).

<sup>18</sup> See Turkewitz, *supra* note 11 (explaining that the massacre surpassed the former record for mass shootings).

<sup>19</sup> See Meghan Keneally & Emily Shapiro, *Funeral Held for 9 Members of Same Family Killed in Texas Church Shooting*, ABC NEWS (Nov. 15, 2017), archived at <https://perma.cc/VMQ4-5NKC> (describing the details of the deadliest modern mass shooting in the history of Texas).

<sup>20</sup> See Adam Goldman et al., *Texas Church Shooting Video Shows Gunman's Methodical Attack, Official Says*, N.Y. TIMES (Nov. 8, 2017), archived at <https://perma.cc/32KK-6TBV> (explaining how the death toll was captured on video camera).

<sup>21</sup> See *id.* (detailing the effects caused by David Kelly's actions on November 5, 2017).

<sup>22</sup> See *id.* (explaining the type of weapon that was used in the church).

<sup>23</sup> See Turkewitz, *supra* note 11 (describing gun brought into school in duffle bag); see also Jervis & Johnson, *supra* note 15 (citing that shooting took place from 32nd floor of hotel); see also Goldman, *supra* note 20 (explaining shooting in rural church).

Smart guns are firearms that are equipped with safety technology to only fire when operated by an authorized user.<sup>25</sup> Some smart guns use biometric security measures, which utilize unique characteristics, like a fingerprint, to authorize use of the device.<sup>26</sup> There are also smart guns utilizing radio frequency identification (RFID) technology, which locks the firearm unless it is in proximity to a remote, similar to the iPhone unlocking a user's Apple Watch.<sup>27</sup> Other smart guns are incorporating new technologies like blockchain to keep an electronic record of use occurrences.<sup>28</sup>

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<sup>24</sup> See Turkewitz, *supra* note 11 (explaining that Nikolas Cruz used an AR-15 rifle with magazine hidden in black duffle bag); see also Jervis & Johnson, *supra* note 15 (describing the arsenal of guns and ammunition in Las Vegas hotel room); see also Goldman, *supra* note 20 (noting the AR-556 semiautomatic assault rifle used).

<sup>25</sup> See *Smart Guns 101*, SMART TECH (Oct. 22, 2017), archived at <https://perma.cc/X93M-4NFW> (providing a crash course in biometric security functions on firearms, firearms that use radio frequency identification systems and technologically advanced external gun locks and safes). Biometric security functions and Radio Frequency Identification security functions ("RFID") on weapons are designed so that the firearm will only discharge for the owner of the gun. *Id.*

<sup>26</sup> See Raymond Blackmun, *What is Biometric Security? – Definition, Systems & Devices*, STUDY.COM (Feb. 24, 2018), archived at <https://perma.cc/P7JH-KAXQ> (describing the unique characteristics that can be associated with biometric security measures). The unique characteristics include voice patterns, the iris, the retina pattern of the eye, and fingerprint patterns. *Id.*

<sup>27</sup> See Katharine Gammon, *The Tech Behind Smart Guns*, INSIDE SCI. (Feb. 8, 2016), archived at <https://perma.cc/BG3V-9LRF> (explaining that RFID uses chips that correspond to the owner whereas biometric technology uses qualities of the owner's body to identify the gun owner).

<sup>28</sup> See Ariel Schwartz, *Every Bullet This Gun Fires Would Be Automatically Tracked in a Database – Here's Why*, BUS. INSIDER (July 12, 2016), archived at <https://perma.cc/LMF8-XJLS> (favoring one of the prototypes from the Ideo coLAB). The Ideo coLAB developed numerous prototypes in a venture to incorporate cutting edge technologies to innovate new and useful products, bringing together industry experts from companies that include Liberty Mutual Insurance, Citi Ventures and Fidelity. *Id.*

Smart guns have been proposed as a viable solution to curb gun violence in the United States.<sup>29</sup> However, smart gun opponents argue that high-tech weapons constrain their Second Amendment rights, while offering only the illusion of security.<sup>30</sup> These critics claim that the sophistication of smart guns lead individuals into believing the gun is safer than it is.<sup>31</sup>

Mass shootings are defined as any shooting where four or more persons are killed or injured.<sup>32</sup> While mass shootings are only responsible for 1.5% of gun deaths in the United States, recent events have called for legislators and activists alike to present and fight for preventative measures.<sup>33</sup> The Second Amendment is not an absolute right.<sup>34</sup> However, every state is bound by the Fourteenth Amendment of the United States Constitution to enforce public safety as a right for its citizens.<sup>35</sup> This balance between limitations and constitutional rights is blurred where smart guns are concerned.

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<sup>29</sup> See *Gun Safety Can Save Lives*, SMART TECH (Oct. 22, 2017), archived at <https://perma.cc/NE42-GNHW> (giving statistics on smart guns and their abilities to assist in decreasing accidental shootings, suicide rates and rates of stolen firearms); see also *infra* Part III. Premise (offering background of legislative action in New Jersey which was introduced to curb gun violence).

<sup>30</sup> See Jessica Hullinger, *Whatever Happened to the So-Called "Smart Gun"?*, FAST CO. (Jan. 6, 2016), archived at <https://perma.cc/D786-M4PY> (explaining the NRA's official stance on smart gun policy). The NRA is not necessarily opposed to the development and research of new technology but does oppose the prohibition of selling traditional firearms, specifically when the smart gun technology is fully developed. *Id.*

<sup>31</sup> See Andy Greenberg, *Anybody Can Fire This 'Locked' Smart Gun with \$15 Worth of Magnets*, WIRED (July 24, 2017), archived at <https://perma.cc/7VLH-VQKL> (explaining the attitude that smart guns are effectively making firearms less safe because they offer the illusion of security through easily bypass-able systems).

<sup>32</sup> See JAMES E. ATWOOD, *GUNDAMENTALISM AND WHERE IT'S TAKING AMERICA* 9 (2017) (discussing the statistics for mass murders in the United States).

<sup>33</sup> See *id.* at 17 (estimating that mass shootings represent only 1.5% of gun fatalities, while the majority of gun deaths are due to suicide).

<sup>34</sup> See U.S. CONST. amend. II (enumerating the right to bear arms); see also *Dist. of Columbia v. Heller*, 554 U.S. 570, 602 (2008) (enumerating that the right to own firearms is not an absolute right); see also *infra* Part II. History (examining the constitutional implications of placing restrictions on firearms ownership, a right guaranteed by the Second Amendment).

<sup>35</sup> See U.S. CONST. amend. XIV, § 1 (providing that states have the duty to ensure that any laws created by a state do not rob a citizen of their rights to life, liberty or property without due process of law, effectually guaranteeing the rights to protect a citizen from another in the name of saving lives and upholding this right).

This Note will examine: 1) smart gun technologies employing biometric security functions, RFID and blockchain security systems on firearms; 2) their impact on mass shootings; and 3) what implications this could have on the Second and Fourteenth Amendments. Part II discusses the innovation landscape of firearms in the United States beginning with Samuel Colt,<sup>36</sup> and ending with recent developments in biometric security. Part III discusses industry perspectives on the use of smart guns and how industry leaders and companies could influence gun control. Part IV analyzes the benefits and consequences of smart gun legislation and its impact on constitutional rights. Part V draws a conclusion calling for change that preserves constitutional integrity with consideration of the right of every citizen to be safe.

## II. History: A History United Leads to a Country Divided

*“God made men, but Samuel Colt made men equal.”* – Unknown origins<sup>37</sup>

Samuel Colt introduced the world to the first successfully mass-produced revolver.<sup>38</sup> Although innovations on the firearm have

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<sup>36</sup> See Stephen V. Grancsay, *An Exhibition of Colt Percussion Revolvers*, THE METRO. MUSEUM OF ART, Feb. 24, 2018, at 30, JSTOR (describing Samuel Colt as a pioneer in mass production of effective handguns using the first multi-firing arm that had practical value as a military weapon and the first to be made in quantity because of its use of automatic revolution and locking of the cylinder operated by cocking the hammer). Firearms were first introduced into the military systems of Europe in the fourteenth century. *Id.* Subsequently, there was not much improvement until the nineteenth century when percussion caps were introduced. *Id.* Samuel Colt was able to change the fundamental schema of the world of weaponry because of his innovations and his ability to mass produce his inventions. *Id.*

<sup>37</sup> See Joel Rose, *How an Idea to Develop a Safer, Smart Gun Backfired*, NPR (Apr. 7, 2016), archived at <https://perma.cc/AAF7-3DDL> (transcribing a broadcast of an interview of Donald Zilkha, the former CEO of Colt). Zilkha tried to implement smart gun research and a smart gun prototype but was systematically shunned in the firearms community due to the fear of tighter gun control. *Id.*

<sup>38</sup> See Grancsay, *supra* note 36, at 30 (describing the technology that made Samuel Colt a house-hold name through its efficiency and popularity, carried through by the Colt’s ability to mass-manufacture). Colt revolutionized the gun industry through his patent for a revolving mechanism which used fulminate ignition and percussion caps that would deliver successive shots rapidly. *Id.* Fulminate ignitions and the use of percussion caps were not innovated by Colt, but the 19<sup>th</sup> century gun manufacturer did mass supply the United States Military with firearms successfully

occurred frequently throughout history, its core function has changed very little.<sup>39</sup> Ultimately, a trigger releases a firing pin, which strikes ammunition, causing a small and contained explosion which launches a projectile, or bullet, down a metal tube at a target.<sup>40</sup> The firearm industry generates a vast economic influence.<sup>41</sup> Gun enthusiasts perpetuate this by developing a culture of praise towards weapon modifications the same way car enthusiasts have developed a culture of praise towards modifying old Honda Civics.<sup>42</sup>

In 1998, Colt's Manufacturing Company LLC developed a gun that required a radio-frequency prototype, but it was not well received by the American public because of vigorous backlash and organized boycotts by the National Rifle Association.<sup>43</sup> In 2005, the extrinsic pressure from the National Rifle Association led Congress to pass the "Protection of Lawful Commerce in Arms Act", which disincentivizes companies to test and develop smart guns.<sup>44</sup>

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equipped with both earlier inventions. *Id.* Fulminate ignitions use the chemical compound mercury fulminate to deliver a strong explosion that was more reliable in weather conditions than flintlock ignitions. *Id.* Percussion caps hold the mercury fulminate and contain the explosion, as opposed to the flintlock, which bore exposed explosions, increasing the potential for harm. *Id.*

<sup>39</sup> See Katie O'Connell, *Innovation in the Gun Industry*, INNOVATION TRAIL (Feb. 5, 2013), archived at <https://perma.cc/TQW7-ZEPY> (discussing that firearm design has not changed dramatically).

<sup>40</sup> See *id.* (discussing the various perspectives of gun innovation in the United States).

<sup>41</sup> See Jade Moldae, *U.S. Firearms Industry 2017*, SHOOTING INDUS. (Apr. 18, 2018), archived at <https://perma.cc/MJ5Q-4PPA> (outlining the statistics on firearms and the economy).

<sup>42</sup> See ATWOOD, *supra* note 32, at 30-31 (discussing how innovations in the gun industry are unparalleled in progress, research and development toward manufacturing efficient and destructive products such as the Slide Fire Gun, or "Bump Stocks"). "Bump Stocks" are a weapon modification that essentially makes a semi-automatic weapon fire in a continuous automatic capacity. *Id.* "Bump Stocks" make semi-automatic weapons automatic weapons because the stock absorbs the kickback, drives the base of the weapon forward again (bumping) where it continues to fire. *Id.*

<sup>43</sup> See Gammon, *supra* note 27 (generalizing from the article interviewing the former CEO that implemented such a program); see also Josh Harkinson, *Welcome to the Future of Gun Control* MOTHERJONES (Apr. 2, 2018), archived at <https://perma.cc/B43X-HJW5> (discussing the reasons that the smart gun was not accepted by the public).

<sup>44</sup> See Harkinson, *supra* note 43 (surmising the impact of early smart gun movements and failures). The Protection of Lawful Commerce in Arms Act makes

It was not until 2013 that companies began meaningfully investing money in technologically-advanced guns.<sup>45</sup> Smart Tech Foundation, the nation's leading organization supporting the development of innovative solutions to prevent accidental gun deaths and teen suicides, offered \$1,000,000 to innovators to research and develop a better smart gun.<sup>46</sup> By 2014, the German firearms company Armatix released "iP1," the first commercially available smart gun on the market which utilizes RFID technology in a smart watch.<sup>47</sup> In 2015, Mossberg, a leader in the market of firearms for home defense, released an RFID shotgun that can only be fired if the gun owner is wearing a ring.<sup>48</sup> Mossberg says that his company, O.F. Mossberg & Sons, the oldest family owned gun company in the United States, is vigorously integrating the RFID technology under his authority in the name of safety for the gun owner.<sup>49</sup> Mossberg and Armatix are not alone, and today, symposiums are being held at various locations throughout the country showcasing the newest technologies in smart guns.<sup>50</sup>

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the company liable for any defects, and not liable for crimes committed with the firearm. *Id.*

<sup>45</sup> See Hullinger, *supra* note 30 (describing that Smart Tech Foundations announced a new initiative at their Innovation Uncensored event sponsored by Fast Company).

<sup>46</sup> See Hullinger, *supra* note 30 (noting that Smart Tech Foundations offered \$1,000,000 toward spurring innovation to create smart guns).

<sup>47</sup> See Joel Rose, *A New Jersey Law that's Kept Smart Guns off Shelves Nationwide*, NPR (June 24, 2014), archived at <https://perma.cc/V52Y-YSLC> (describing the German company's design for the iP1). The iP1 uses an electronic chip that allows it to be fired only if the shooter is wearing a watch that communicated with it through a radio signal. *Id.*

<sup>48</sup> See Jonathan Mossberg, *Safeguarding the Power of a Shotgun with the Security of a Unique Computer Chip*, SMART TECH (Oct. 22, 2017), archived at <https://perma.cc/27HC-DQG5> (viewing Jonathan Mossberg and his iGun, a shotgun that will not fire unless the shooter is wearing a specifically designed ring which uses an electric current to actuate a mechanism that unblocks the trigger).

<sup>49</sup> See *id.* (expounding on the thoughts of Jonathon Mossberg, the owner of Mossberg which is a prominent shotgun company in the United States); see also Harkinson, *supra* note 43 (explaining a hypothetical situation where a parent would need a smart gun to protect the family from intruders while not allowing the firearm to be accessed by a user not wearing a ring, like a child).

<sup>50</sup> See *Smart Gun Symposiums*, L. ENFORCEMENT TODAY (May 31, 2017), archived at <https://perma.cc/M89L-SKVV> (reporting on a smart gun symposium in Seattle, WA); see also Amy Fawcett, *Is Smart Gun Technology Viable? Smart Gun Symposium Recap*, WASH. TECH. (Feb. 4, 2015), archived at <https://perma.cc/X6EW-D52R> (advertising smart gun symposiums in Washington State); *Law Enforcement and Smart Gun Symposium in Washington DC*, WASH. CEASEFIRE (July 8, 2017),



Several Fortune 500 companies also contribute to smart gun technology.<sup>51</sup> While RFIDs and biometric security functions have been around for some time, some companies are leveraging more cutting-edge technologies.<sup>52</sup> Specifically, in 2016 a group of professionals worked on a project integrating blockchain with a firearm, aptly named “Glockchain.”<sup>53</sup> Blockchain is a technology that establishes a ledger that cannot be altered after an occurrence has been recorded.<sup>54</sup> Glockchain keeps a ledger of exactly when and where a firearm is discharged.<sup>55</sup> The advantage of this is the added security and accuracy of the record that is automatically created.<sup>56</sup>

#### A. *Guns: An Ingrained Constitutional Right*

The Second Amendment is a constitutional right as part of the Bill of Rights.<sup>57</sup> The Bill of Rights is protected under the Fourteenth

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archived at <https://perma.cc/M8YK-PEYH> (additionally presenting ads regarding smart gun symposiums in Washington DC).

<sup>51</sup> See Schwartz, *supra* note 28 (discussing the use of Glockchain). Glockchain is a prototype for a smart gun that utilizes blockchain technology to keep a record of firearm discharges that cannot be altered. *Id.*

<sup>52</sup> See Schwartz, *supra* note 28 (describing the collaborative effort from the Ideo coLAB).

<sup>53</sup> See Schwartz, *supra* note 28 (noting that Glockchain uses Blockchain to create a ledger that records when a firearm is discharged). The technology is designed for use by the police to incorporate additional accountability when firearms are used in the line of duty. *Id.*

<sup>54</sup> See *What is Blockchain?*, IBM (Dec. 4, 2018), archived at <https://perma.cc/2MVY-P2NK> (defining blockchain technology and marketing several advantages to business practices).

<sup>55</sup> See Schwartz, *supra* note 28 (comparing the Glockchain to traditional smart guns). Jing Ling, an IT project manager that worked on the Glockchain team stated how “[u]nlike a traditional smart gun, you can see who’s holding the gun. Then you can pair with video for a time record.” *Id.*

<sup>56</sup> See Schwartz, *supra* note 28 (exploring the benefits of Glockchain technology to law enforcement practices to promote greater police officer accountability). “A gun that’s tied to the blockchain, then, could force the police into accountability. ‘Unlike a traditional smart gun, you can see who’s holding the gun. Then you can pair that with video for a time record.’” *Id.*

<sup>57</sup> See *Heller*, *supra* note 34, at 635 (2008) (striking down a District of Columbia’s law that restricted personal handgun ownership as a violation of the Second Amendment). The law specifically prohibited citizens from carrying unregistered firearms and prohibited the registration of certain types of handguns. *Id.* at 574. The law empowered the D.C. police chief to issue temporary licenses to citizens to carry such guns. *Id.* at 575. The law required D.C. residents who possessed lawfully

Amendment as these rights are “deeply rooted in this Nation’s history and tradition” and therefore must be shielded from state infringement.<sup>58</sup>

The Second Amendment of the United States Constitution grants and protects the right of citizens to own firearms.<sup>59</sup> The Supreme Court of the United States affirmed this right in its ruling in *District of Columbia v. Heller*.<sup>60</sup> *Heller* enumerates the right to bear arms under the Second Amendment at the federal level.<sup>61</sup> Justice Antonin Scalia authored the opinion stating that to “keep or bear arms” expressly means the constitution grants the right to have the firearm in one’s possession.<sup>62</sup> The Court turned to the Framers’ intent in drafting the Amendment and decided that the intent in arming the public was to form a “well-regulated militia” to protect against a tyrant’s standing army.<sup>63</sup> However, the Court specifically noted that reasonable restrictions may be implemented against individuals obtaining firearms.<sup>64</sup>

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owned guns to store them unloaded and disassembled or bound by a trigger lock or a similar device. *Id.* The Supreme Court’s opinion adopted an interpretation of the Second Amendment that recognizes an individual’s right to possess a firearm completely divorced from militia service. *Id.* at 582.

<sup>58</sup> See *McDonald v. City of Chi.*, 561 U.S. 742, 744 (2010) (building upon the Supreme Court’s holding in *Heller* by striking down a city ordinance practically outlawing the personal possession of a handgun within city limits). The Court held the Second Amendment enshrines an individual’s right to self-defense, therefore, the Second Amendment is applicable to the states through the Fourteenth Amendment’s Due Process Clause. *Id.* at 791.

<sup>59</sup> See U.S. CONST. amend. II, *supra* note 34 (“[W]ell regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.”).

<sup>60</sup> See *Heller*, *supra* note 34, at 616 (stating that citizens have a constitutionally protected right to keep handguns in the home for self-protection).

<sup>61</sup> See *Heller*, *supra* note 34, at 599-600 (tearing down the dissenting opinion that self-defense had little to do with the Second Amendment at the time of codification).

<sup>62</sup> See *Heller*, *supra* note 34, at 602 (alluding to the definition of bear arms to justify the prohibition of firearm regulations that leave the weapons fundamentally unusable).

<sup>63</sup> See *Heller*, *supra* note 34, at 610 (stating that the Framers wanted to protect against policies, similar to England, where a militia was suppressed and therefore the standing army could impose the will of the ruler).

<sup>64</sup> See *Heller*, *supra* note 34, at 634 (reasoning convicted felons and those with mental illnesses should be restricted from obtaining firearms).

*Heller* is not the only case that wrestled with gun ownership rights.<sup>65</sup> *McDonald v. City of Chicago* affirms the rights upheld in *Heller*, and bans individual states' power to ban firearms.<sup>66</sup> The *McDonald* court furthers *Heller* by enumerating the right to bear arms to the states under the Due Process clause of the Fourteenth Amendment.<sup>67</sup> *McDonald* is monumentally important to gun control because, while states must uphold an individual's right to bear arms, this power to regulate creates discrepancies among the 50 states, leaving some with strict laws and others with loose laws.<sup>68</sup>

The Supreme Court of the United States has been purposefully quiet on the issue of gun control.<sup>69</sup> Only a week after the tragedy in Parkland, the Supreme Court denied certiorari in a case challenging the constitutionality of a 10-day waiting period for firearms purchases in California.<sup>70</sup> This is just one of the several examples of the Court turning away from the gun control debate because the Court has remained silent on the issue since the decisions of *Heller* and *McDonald*.<sup>71</sup>

The right to bear arms has limitations.<sup>72</sup> *Hightower v. City of Boston* asserts that the States have discretion to decide who can

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<sup>65</sup> See *McDonald*, *supra* note 58, at 744 (citing to the Supreme Court's prior *Heller* decision, which recognizes the Second Amendment as a fundamental right).

<sup>66</sup> See *Heller*, *supra* note 34, at 615-16 (holding individual self-defense is a central component of the Second amendment); see also *McDonald*, *supra* note 58, at 744 (noting how the court held that individual self-defense is the central component of the Second amendment).

<sup>67</sup> See *McDonald*, *supra* note 58, at 791 (ruling that the Due Process clause of the Fourteenth Amendment incorporates the Second Amendment right recognized in *Heller*).

<sup>68</sup> See *McDonald*, *supra* note 58, at 791 (addressing criticism of the Court's expansive interpretation of the Second Amendment as necessary since the Government cannot easily regulate an individual's enumerated constitutional right once it is recognized by courts).

<sup>69</sup> See Andrew Chung, *Supreme Court Snubs Challenge to California Gun Waiting Period*, REUTERS (Feb. 20, 2018), archived at <https://perma.cc/Q9NK-YB5P> (outlining the Supreme Court's lack of decision making regarding firearms regulations).

<sup>70</sup> See *id.* (categorizing the Supreme Court's behavior as unchanged subsequent the tragedy that took 17 lives at the hands of an assault rifle).

<sup>71</sup> See *id.* (reiterating the notion that the Supreme Court has not effectively made decisions since its landmark cases that established Second Amendment protections).

<sup>72</sup> See *Hightower v. City of Bos.*, 822 F. Supp. 2d. 38 (D. Mass. 2011), *aff'd*, 693 F.3d 61 (1st Cir. 2012) (explaining police officer's claim that restricting gun ownership and licensure was denied due to state action).

maintain a license to own a firearm.<sup>73</sup> The Court ruled that states also have authority to establish the qualifications that a potential gun owner must possess.<sup>74</sup>

Restrictions, such as prohibition of certain aftermarket modifications and models of firearms, have also been placed throughout the country over gun ownership.<sup>75</sup> Recently, in direct consequence of the tragedy in Las Vegas, Massachusetts sent letters to gun owners throughout the state stating bump stocks are illegal, and demanding that anyone in possession of a bump stock to turn it in without compensation or be subject to criminal prosecution.<sup>76</sup> These measures straddle a fine line between infringing constitutional rights to own a firearm and restrictions that uphold State autonomy in its citizens' interests.<sup>77</sup>

State action is justified for reasonable restrictions and common sense gun laws under the umbrella of public safety.<sup>78</sup> In the first sentence of the Constitution, the Framers call for a country where all of its citizens live in "domestic tranquility."<sup>79</sup> Public safety is enforced in the Constitution under the Fourteenth Amendment.<sup>80</sup>

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<sup>73</sup> See *Hightower*, 822 F. Supp. 2d. at 55-56 (stating that the Fourteenth Amendment gave the Commonwealth discretion to place reasonable restrictions on gun ownership and that these restrictions did not impede on the Second Amendment).

<sup>74</sup> See *Hightower*, 822 F. Supp. 2d. at 55-56 (restricting gun ownership based on qualities such as having a sound body and mind). These restrictions are not explained in a black letter formula; but rather, in a general sense that allows the discretion of judicial officials when the facts are considered in the totality of the circumstances. *Id.*

<sup>75</sup> See Christina Hager, *Only a Few Bump Stocks Turned in to Police Despite Massachusetts Ban*, CBS BOS. (Feb. 2, 2018), archived at <https://perma.cc/55A9-LZXK> (addressing the reluctance for Massachusetts citizens to turn in their banned aftermarket weapon modifications, specifically bump stocks).

<sup>76</sup> See *id.* (describing the ineffectual and legally questionable action by of Massachusetts).

<sup>77</sup> See *Hightower*, 822 F. Supp. 2d. at 65 (citing *Plummer v. Town of Somerset*, 601 F. Supp. 2d 358, 366-67 (D. Mass. 2009)) (quoting: "A police department is a highly regimented organization that must, in the interests of morale, efficiency, and public safety, place restrictions on the constitutional rights of its rank-and-file that exceed those permitted with regard to civilian employees.").

<sup>78</sup> See *Hightower*, 822 F. Supp. 2d at 46 (pointing to *Heller* in deciphering that the right secured by the Second Amendment is not unlimited).

<sup>79</sup> See U.S. CONST. pmbl. (explaining the Preamble text which states that all people have a right to live in a place where there is generally peace).

<sup>80</sup> See U.S. CONST. amend. XIV, *supra* note 35 ("[No State] shall deprive any person of life, liberty, or property."); see also Linda R. Monk, *Equality and the Fourteenth Amendment: A New Constitution*, PBS (Oct. 22, 2017), archived at

With staggering gun violence statistics affecting the daily lives of person in the United States, the need for increased security in the home and in our streets grows stronger every day.<sup>81</sup>

*B. There's Proof in the Data*

Data can be misleading.<sup>82</sup> Implicit bias in collecting data and tactical presentation of results subjects almost any data set to manipulation to support a cause.<sup>83</sup> The call for honest statistics is imperative when navigating through an issue as hotly contested as firearms in the United States.<sup>84</sup> While data can be misleading, it is helpful to identify trends to understand the magnitude of gun violence.

The United States has had over 650,000 military personnel casualties in war since the country was founded.<sup>85</sup> Since 1968, there have been more deaths on home soil at the barrel of a gun than all military deaths combined.<sup>86</sup> Today, there are nearly 350,000,000

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<https://perma.cc/Q6FC-K49A> (explaining the ramifications of the interpretations of the Fourteenth Amendment).

<sup>81</sup> See Julie Turkewitz & Anemona Hartocollis, *Highlights: Students Call for Action Across Nation; Florida Lawmakers Fail to Take Up Assault Rifle Bill*, N.Y. TIMES (Feb. 20, 2018), archived at <https://perma.cc/4HJL-5AUG> (discussing the recent rise by students for tighter constrictions on gun control in the United States as a consequence of the events in Parkland, Florida).

<sup>82</sup> See Leaf Van Boven & Paul Slovic, *The Psychological Trick Behind Trump's Misleading Terror Statistics*, POLITICO (Jan. 28, 2018), archived at <https://perma.cc/NDX8-BSA6> (reasoning that President Donald J. Trump's tweet about foreign born terrorist statistics is inaccurate and asserts that the President used the statistic to support his immigration foreign policy).

<sup>83</sup> See *id.* (listing examples of dishonest data integration). The article uses National Basketball Association ("NBA") statistics to support its assertion about inaccurate data standards. *Id.* For example, of 450 NBA players, about  $\frac{3}{4}$  are African American. *Id.* Among more than 20 million African-Americans, less than 0.01 percent will play in the NBA. *Id.* In total, we can be about 75 percent confident that a man is African-American if he is an NBA player. *Id.* But, if we only know someone is African-American, the data supports that there's 0.01 percent chance he is an NBA player. *Id.*

<sup>84</sup> See Turkewitz & Hartocollis, *supra* note 81 (discussing the importance of honesty and integrity regarding the issue of gun violence).

<sup>85</sup> See *Americas Wars*, U.S. DEP'T OF VETERANS AFF., (May 2017), archived at <https://perma.cc/T8MA-RUR5> (listing totals for deaths in America's wars on the battlefield).

<sup>86</sup> See ATWOOD, *supra* note 32, at 10 (stating that more American Citizens have died from guns since 1968 than military personnel on the battlefields of all America's wars since 1775).

firearms in circulation in the United States.<sup>87</sup> These firearms are responsible for the death of 33,000 people annually, as well as injuries for an additional 70,000.<sup>88</sup> Since the 1970s, the number of fatalities caused by a gun has not fallen below 32,000 annually.<sup>89</sup> In 2015, there were more mass shootings than days in a calendar year.<sup>90</sup>

Despite the statistics, U.S. citizens have maintained a constitutional right to own firearms.<sup>91</sup> Legislative attempts at restricting gun ownership have stagnated.<sup>92</sup> Advocates of the Second Amendment state that the right to own a firearm guarantees all other constitutional rights.<sup>93</sup> By this, these advocates imply that ownership of military grade weapons protects them against a tyrannical government.<sup>94</sup> In this paradigm, a patriot, just like in the days of old, would use his gun in revolution to fight oppression, similar to George Washington fighting against British tyranny in the American Revolution.<sup>95</sup>

There is no federal legislation that is currently in place that defines and regulates smart gun usage.<sup>96</sup> In April 2016, President

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<sup>87</sup> See ATWOOD, *supra* note 32, at 20 (giving statistics estimated from the Federal Bureau of Investigation).

<sup>88</sup> See ATWOOD, *supra* note 32, at 20 (explaining that Virginia and other states report more deaths by firearms than by automobiles).

<sup>89</sup> See ATWOOD, *supra* note 32, at 25 (estimating that 1.7 million children live in homes where firearms are loaded and unlocked).

<sup>90</sup> See ATWOOD, *supra* note 32, at 9 (stating that in 2015 there were more mass shootings than days on the calendar).

<sup>91</sup> See *Heller*, *supra* note 34, at 615 (establishing the right to bear arms as an essential right).

<sup>92</sup> See David Frum, *Mass Shootings Don't Lead to Inaction – They Lead to Loosening Gun Restrictions*, THE ATLANTIC (Oct. 3, 2017), archived at <https://perma.cc/P5Q3-JXLF> (noting that after mass shooting states have expanded the right to carry).

<sup>93</sup> See Bill Flax, *The Second Amendment is What Makes the Other Nine Possible*, FORBES (Jan. 15, 2013), archived at <https://perma.cc/FK2Q-ZYZY> (stating that disarming American citizens by restricting Second Amendment rights is the precursor to tyranny).

<sup>94</sup> See *id.* (codifying the implicit nature that exists when citizens state that the right to bear arms protects their interests by insuring against a tyrannical government using the threat of violence).

<sup>95</sup> See *id.* (discussing that firearms protect a person's liberty because it enables him to fight against tyranny).

<sup>96</sup> See *Smart Guns*, GIFFORD'S L. CTR. TO PREVENT GUN VIOLENCE (Oct. 22, 2017), archived at <https://perma.cc/L7A7-WDB4> (stating that federal law does not set any regulations for domestically manufactured firearms, and that the Consumer Product

Barack Obama signed an executive order calling for Executive Agencies to begin research and development into the technology.<sup>97</sup> By November of the same year, President Obama released new baseline specifications for law enforcement service pistols, which included smart gun technology.<sup>98</sup> The report called for implementing RFID smart guns.<sup>99</sup> If the technology seems logical and it is available, why has the world not accepted smart guns as the new norm?<sup>100</sup> The evidence lies in the ability to compromise smart gun technology through sophisticated and simple tactics.<sup>101</sup>

### III. Premise: Why Culture Stagnates Progression

Only three states – Maryland, New Jersey, and Massachusetts – have addressed smart gun legislation.<sup>102</sup> These states have had trouble from the gun industry.<sup>103</sup> Maryland has defined the smart gun as a firearm manufactured with technology that only allows discharge by an authorized user with characteristics that protect the technology from being easily deactivated.<sup>104</sup> They have also required a review of

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Safety Act specifically excludes firearms and ammunition, effectively leaving a gap in enforceable regulation on guns).

<sup>97</sup> See *id.* (stating that incentives need to be developed for gun manufacturers to begin working on smart-gun technology).

<sup>98</sup> See *id.* (establishing specific conditions under which firearm companies would consider purchasing firearms with advanced gun safety technology).

<sup>99</sup> See *Baseline Specification for Law Enforcement Service Pistols with Security Technology*, NAT'L INST., OF JUST. REP. (Nov. 2010), archived at <https://perma.cc/QUZ4-8AYN> [hereinafter *Baseline Specification*] (outlining the specification for security measures on firearms).

<sup>100</sup> See Pavithra Mohan, *Why Smart Gun Tech Isn't Getting More Funding*, FAST CO. (Mar. 22, 2018), archived at <https://perma.cc/AA3R-85RY> (examining the motivations behind the lack of gun innovations subsequent to mass shootings).

<sup>101</sup> See Andy Greenberg, *Anybody Can Fire This 'Locked' Smart Gun with \$15 Worth of Magnets*, WIRED (July 24, 2017), archived at <https://perma.cc/7VLH-VQKL> (discussing the way a hacker compromised millions of dollars of technological research and development with \$15 worth of magnets by being able to manipulate a smart guns electromagnetic locking system). The test also utilized a high-tech signal jammer that was able to effectively disable a smart gun by interfering with the radio frequency identification lock. *Id.*

<sup>102</sup> See *Smart Guns*, *supra* note 96 (stating that Massachusetts, New Jersey, and Maryland are the only states to address smart gun issues via legislation).

<sup>103</sup> See *Smart Guns*, *supra* note 96 (referring to the slow progress in the legislative arena regarding smart guns).

<sup>104</sup> See *Smart Guns*, *supra* note 96 (discussing the definition of smart gun as defined by Maryland). Maryland categorizes smart guns as “personalized handguns.” *Id.*

the status of new smart gun technologies as they come available, but have not mandated requirements.<sup>105</sup> Likewise, Massachusetts has included smart guns as an alternative to locking devices on firearms, but the Massachusetts State Police have yet to identify any weapons that comply with requirements established in statute.<sup>106</sup>

New Jersey is the only state that has gone as far as to actually adopt a law on smart guns.<sup>107</sup> The bill states that once the technology is ready for consistent, safe smart guns, smart guns will be exclusively available for retail sale.<sup>108</sup> However, New Jersey's legislation is largely considered a failure.<sup>109</sup> Smart gun advocates consider this a debilitating blow for the smart gun movement because 1) it has virtually halted all development and 2) it is not feasible for a company to develop a product that would render all other products obsolete.<sup>110</sup> Recently, smart gun advocates have tried to reinvigorate the bill with new legislation, but Governor Chris Christie pocket vetoed the democrat-supported bill, perpetuating the original failure.<sup>111</sup>

New Jersey's laws on smart guns created a rift in the market.<sup>112</sup> On one side, people call for government regulation and on the other

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<sup>105</sup> See *Smart Guns*, *supra* note 96 (explaining the abysmal rate at which legislative action has moved on this issue).

<sup>106</sup> See MASS. GEN. LAWS ch. 140, § 131K (2001) (requiring any handgun or large capacity weapon be sold with a safety device designed to prevent the discharge of such weapon by unauthorized users).

<sup>107</sup> See N.J. STAT. ANN. § 2C:58-2.4 (West 2002) (outlining specifications and exceptions on a controversial firearms legislation).

<sup>108</sup> See Rose, *supra* note 47 (providing justifications behind the passing of the "Childproof Handgun Law"). The Childproof Handgun Law placed regulations attempting to mitigate high tensions subsequent to the Sandy Hook Elementary School, where a mass-shooter murdered elementary school children and teachers with a stolen assault rifle. *Id.*

<sup>109</sup> See Rose, *supra* note 47 (pointing to the direct statements by firearm advocate groups, which have ultimately discouraged smart gun implementation).

<sup>110</sup> See Rose, *supra* note 47 (describing the impact that the New Jersey legislation has had on the gun industry, namely pointing to how the stagnated smart gun technology derives from the legislation's industrial standards).

<sup>111</sup> See Samantha Marcus, *Christie Vetoes Controversial Smart Gun Bill*, NJ.COM, (Jan. 20, 2016), archived at <https://perma.cc/M7GC-TRTQ> (describing the manner in which Governor Christie pocket vetoed a bill that was allegedly supposed to bolster the existing legislation, and how this pocket veto shot the bill dead).

<sup>112</sup> See Rose, *supra* note 47 (arguing that the New Jersey legislation was overly aggressive because it demanded a drastic change for companies to provide all hand guns with biometric security features which essentially outlaws any gun that is not a smart gun).



side, gun advocates bar interference.<sup>113</sup> Many citizens hold strong political stances on guns as a means to protect their children and their homes.<sup>114</sup> But, the public weeps at the feet of accidental shootings, especially when reliable and popular news outlets such as the Washington Post (“The Post”) report on stories where children in the United States accidentally kill their siblings at the hands of a gun.<sup>115</sup> According to the data, guns killed more children in America between 1999 and 2013 than police officers in the line of duty.<sup>116</sup> These statistics frighten some individuals to the point where they stand together with a common goal: ban guns or at least limit them.<sup>117</sup>

Smart guns may have their shortcomings, but they could protect citizens against accidental gun-related harm.<sup>118</sup> For example, The Post reported an instance where one family used counseling services after their 7-year-old son accidentally shot and killed his three-year-old sister.<sup>119</sup> The boy would tell detectives that he thought the three-year-old “would get up like they do on TV.”<sup>120</sup> This boy was not the authorized user of the firearm that killed his sister, and if the firearm had been a smart gun his sister might still be alive.<sup>121</sup>

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<sup>113</sup> See Mohan, *supra* note 100 (discussing the motivations behind a resurgence in the interest of smart gun technology subsequent to national tragedies such as Sandy Hook and Parkland).

<sup>114</sup> See Terrence McCoy, *After a Toddler Accidentally Shot and Killed his Older Sister, a Family’s Wounds Run Deep*, THE WASH. POST (Dec. 1, 2016) *archived at* <https://perma.cc/NN4X-FS2N> (describing individual instances and tragedies where children use firearms against children); *see also* ATWOOD *supra* note 32, at 5 (describing the author’s log of incredible and often hard-hitting stories that inspire debate on tighter gun control, many of which involve children shooting children)

<sup>115</sup> See McCoy, *supra* note 114 (describing horrible events where children have killed children with firearms and how victims’ families cope with such loss).

<sup>116</sup> See ATWOOD, *supra* note 32, at 5 (describing that police officers in the line of duty died statistically less than children from ages zero to four during the years 1999-2013).

<sup>117</sup> See ATWOOD, *supra* note 32, at 5 (discussing the potential response to staggering gun death statistics).

<sup>118</sup> See ATWOOD, *supra* note 32 (explaining that smart guns are a viable solution to curve gun violence).

<sup>119</sup> See McCoy, *supra* note 114 (describing that counseling was the chief component for the family from the District of Columbia).

<sup>120</sup> See ATWOOD, *supra* note 32, at 5 (providing a quote from the young child who shot and killed his sister, the article states how the child explained that “[g]uns on TV don’t [kill people permanently]”).

<sup>121</sup> See *Smart Guns 101*, *supra* note 25 (explaining the motivations behind using smart guns to prevent accidental shootings).

Accidental shootings account for far more gun deaths than mass shootings, and smart guns are a viable way to reduce these accidental shootings.<sup>122</sup>

Some smart guns, like the Armatix iP1, use radio frequency identification to fire.<sup>123</sup> RFID smart guns are equipped with a ferrous locking mechanism that blocks the firing pin from being engaged.<sup>124</sup> Within the RFID smart gun there is also an electromagnet that is only activated when it receives a radio wave authentication token from another device, such as a watch or ring.<sup>125</sup> The electromagnet is essential because it disengages the ferrous locking mechanism, magnetically dislodging from the firing pin.<sup>126</sup> Simply put, when the electromagnet is on, the locking mechanism is off and the gun can be fired.<sup>127</sup>

RFID technology is being used in several versions of smart guns.<sup>128</sup> However, this technology has been proven to be flawed.<sup>129</sup> A hacker under the pseudonym “Plore” released his findings about effective ways to hack the Armatix iP1.<sup>130</sup> The first way that this can

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<sup>122</sup> See ATWOOD, *supra* note 32, at 17 (discussing gun statistics, specifically depicting the disparity between the numbers of mass shootings and the number of accidental gun deaths).

<sup>123</sup> See Gammon, *supra* note 27 (explaining the technical components of what makes a smart gun work).

<sup>124</sup> See Greenberg, *supra* note 31 (detailing the components of the Armatix iP1 which uses a small silver dowel that blocks the firing pin from being fired until the electromagnet pulls the silver dowel far enough down so that the firing pin can successfully engage and make the weapon operational).

<sup>125</sup> See Gammon, *supra* note 27 (exemplifying how an electromagnet is nonmagnetic until it is electrically charged, in this case from a radio frequency that is given off from a watch).

<sup>126</sup> See Gammon, *supra* note 27 (explaining the mechanics of how the Armatix iP1 operates).

<sup>127</sup> See Gammon, *supra* note 27 (describing the process in which a firearm equipped with RFID technology would unlock a smart gun in order to be used).

<sup>128</sup> See Greenberg, *supra* note 31 (discussing the Armatix iP1, which uses RFID technology encompassed in a watch); see also Mossberg, *supra* note 48 (examining the Mossberg smart gun shotgun, which uses RFID technology encompassed with a ring).

<sup>129</sup> See Greenberg, *supra* note 31 (describing the findings of a hacker known under the pseudonym “Plore” compromised the safety functions of the Armatix iP1 smart gun).

<sup>130</sup> See Greenberg, *supra* note 31 (alluding that “cracking” a smart gun is the process of infiltrating and compromising the security system by making the system work not as intended or not at all).

be done is through a transmitter relay system.<sup>131</sup> Plore uses a transmitter to manipulate the watch signal and relay it to the firearm.<sup>132</sup> This manipulation is carried out through a dual relay system, which greatly increases the locking range.<sup>133</sup> This makes it possible to fire the weapon from a far distance.<sup>134</sup>

Plore spotlights a second hack for the iP1 by way of a circuit that utilizes a transceiver module.<sup>135</sup> Essentially, this transceiver generates a signal at 916.5 megahertz (the average radio broadcast dispenses about 88 to 108 megahertz) and directly interferes with the signal that the watch is sending to the firearm to engage the electromagnet.<sup>136</sup> This interference actually blocks the radio frequency entirely so the owner of the firearm cannot shoot the weapon.<sup>137</sup>

Plore also discovered that simple magnets can hack Armatix iP1.<sup>138</sup> While transceivers and relays are sophisticated pieces of technology that require training and expensive equipment to create, \$15 worth of magnets render the locking mechanism useless.<sup>139</sup> By taking strong magnets and putting them near the electromagnet on the firearm, the ferrous locking mechanism is engaged and the firing pin

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<sup>131</sup> See Greenberg, *supra* note 31 (providing details of Plore's embedded software and hardware experience and expertise as he builds an extender for the range of the radio frequency identification system found in the iP1).

<sup>132</sup> See Greenberg, *supra* note 31 (explaining the process used to demonstrate the flaw in the smart gun).

<sup>133</sup> See Greenberg, *supra* note 31 (describing the process in which the hacker made a relay system that far extended the intended use of the handgun by developing a receiver system to bounce the radio frequency to a farther away receiver).

<sup>134</sup> See Greenberg, *supra* note 31 (explaining that the reason you can fire the weapon farther away is because of the receiver system).

<sup>135</sup> See Greenberg, *supra* note 31 (divulging how the transceiver module is a way to interfere with the radio frequency identification system that is the key component in the weapons security system).

<sup>136</sup> See Greenberg, *supra* note 31 (discussing how the electromagnet is what keeps the gun from being fired because it alone can disarm the locking mechanism when engaged).

<sup>137</sup> See Greenberg, *supra* note 31 (explaining that the watch is blocked from the electromagnet because a signal cannot get through).

<sup>138</sup> See Greenberg, *supra* note 31 (providing the easiest flaw is the least technologically advanced and most accessible way of hacking into the gun).

<sup>139</sup> See Greenberg, *supra* note 31 (alluding to the way in which the hacker busted the smart guns usefulness by making the gun fire with the sole use of magnets).

unlocked.<sup>140</sup> This cheap and relatively easy hack is the most effective way that an unauthorized user can bypass the security function on an RFID smart gun.<sup>141</sup>

Biometric security functions on firearms are a direct result of mass shootings.<sup>142</sup> Kai Kloefer, a teenager from Boulder Colorado, has developed a prototype that uses a fingerprint scanner to unlock a firearm.<sup>143</sup> The prototype uses a sensor to pass a very small electrical current through a fingerprint, which conducts electricity to create an image that allows the weapon to fire.<sup>144</sup> Kloefer states that the technology does not necessarily read your fingerprint in the way one would expect; rather it is similar to electronic signatures at the supermarket.<sup>145</sup> Electronic signatures at supermarkets determine fraud by comparing metrics of the user, such as how a user holds the stylus.<sup>146</sup> Kloefer's design for a fingerprint scanner on a firearm acts in the same capacity, measuring how an individual holds the gun as opposed to reading the lines of their skin.<sup>147</sup> Kloefer's technology is not perfect as the scanner can misread a user's hand if wet or dirty.<sup>148</sup> However, even with these technologies, smart guns will not eradicate gun violence and mass shootings.

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<sup>140</sup> See Greenberg, *supra* note 31 (stating that using the magnets makes the electromagnet useless because the silver dowel that blocks the firing pin in the gun is attracted to the standard magnets and effectively unlocks the gun for unauthorized use).

<sup>141</sup> See Greenberg, *supra* note 31 (explaining why the ability to compromise the locking system using magnets makes the gun susceptible to be hacked and used for a malicious purpose by an unauthorized user).

<sup>142</sup> See Gammon, *supra* note 27 (discussing the protégé from Colorado that was able to develop a prototype for a biometrically secure firearm in the wake of the disaster near his home town some years ago).

<sup>143</sup> See Gammon, *supra* note 27 (describing the process in which the technology works).

<sup>144</sup> See Gammon, *supra* note 27 (eluding to the rationale behind putting equipment such as this on a firearm for security measures).

<sup>145</sup> See Gammon, *supra* note 27 (analogizing the complex and relatively rarely seen technology to something more tangible and used every day).

<sup>146</sup> See Gammon, *supra* note 27 (divulging how electronic signature machines authenticate owners).

<sup>147</sup> See Gammon, *supra* note 27 (describing how the prototype works functionally).

<sup>148</sup> See Gammon, *supra* note 27 (discussing the prototype and pointing out some of its flaws).

#### IV. Analysis: A Problem with No “Good” Answer

Daedalus told Icarus that in order to soar, he needed to fly the middle course, because the middle path stood in balance of life and death.<sup>149</sup> The answer in response to gun violence must be reasonable and stern; it must be strict yet fair; restrictive but not intrusive.<sup>150</sup> If anyone is allowed to have a gun they automatically inherit the power to use it.<sup>151</sup> Gun control legislation could curb the ability to access these guns, but cultural identity and political pressure stagnates regulation.<sup>152</sup> The answer to gun violence must derive from collaborative measures.

Technology should be the vehicle that drives regulation, but current smart guns propose as many issues as they purport to solve.<sup>153</sup> Because smart guns are imperfect, and at times easily manipulated, they are not the sole answer to mass shootings.<sup>154</sup> Smart guns have tested the bounds of regulations.<sup>155</sup> Devastating tragedies make the time ripe for thoughtful and moderate federal legislation to be enacted.<sup>156</sup> Banning all guns is not feasible and continuing with the status quo is dangerous.<sup>157</sup>

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<sup>149</sup> See Josephine Preston Peabody, *Icarus and Daedalus*, COMMON LIT (Apr. 19, 2018), archived at <https://perma.cc/ARY5-YZ8V> (exposing the parable of Icarus as presented by a nineteenth century poet).

<sup>150</sup> See Rose, *supra* note 47 (describing the motivations behind effective gun control through examples of legislation).

<sup>151</sup> See U.S. CONST. amend. II, *supra* note 34 (granting persons in the United States the right to bear arms); see also Heller, *supra* note 34, at 655 (pouring over the history of the Second Amendment to draw the conclusion that self-defense is central to any plausible interpretation of its language).

<sup>152</sup> See ATWOOD, *supra* note 32, at 1 (explicating the cultural import that firearms play in both the indoctrination of protection and everyday life activities).

<sup>153</sup> See Greenberg, *supra* note 31 (discussing the major pitfalls of radio frequency identification smart gun technology).

<sup>154</sup> See Greenberg, *supra* note 31 (illustrating the major flaws of smart gun technology).

<sup>155</sup> See N.J. STAT. ANN. § 2C:58-2.4, *supra* note 107 (explaining the often-contested smart gun legislation that derives from New Jersey); see also *Smart Guns*, *supra* note 96 (describing the state of smart gun integration by way of federal regulations).

<sup>156</sup> See Alter, *supra* note 2 (outlining a recent mass shooting tragedy out of Florida); see also Turkewitz, *supra* note 11 (describing a mass shooting that shook the country by storm).

<sup>157</sup> See Greenberg, *supra* note 31 (explaining why smart guns are not as technologically secure as they appear to be, and for that reason, they are not optimal in protecting people from mass shootings).

Legislation on firearms is paramount for the ability to develop, design, and release viable smart guns.<sup>158</sup> Firearms used in mass shootings are often legally purchased.<sup>159</sup> Smart guns would render all mass-shooters with a vulnerability because law enforcement could remotely hack the firearm.<sup>160</sup> But hacking works both ways; if a cop can hack a criminal's smart gun, a criminal can override the hack.<sup>161</sup> In this way, smart gun technology could help mitigate some destruction, but it does not eradicate it.<sup>162</sup>

The right to bear arms is engrained in American culture and reflected in Supreme Court decisions.<sup>163</sup> *Heller* explained that the federal government does not have the autonomy to ban Americans from their right to bear arms to protect themselves at home.<sup>164</sup> *McDonald* reiterates this in expanding its application to the states.<sup>165</sup> But the right to own firearms is not absolute.<sup>166</sup> Mandating the implementation of smart guns could be interpreted as: 1) a reasonable restriction allowed within the scope of the Second Amendment; or 2)

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<sup>158</sup> See Schwartz, *supra* note 28 (discussing the different avenues that have been attempted by companies to further blockchain technology).

<sup>159</sup> See Jervis & Johnson, *supra* note 15 (explaining the weaponry used in the Las Vegas shootings and how they were purchased legally); see also Goldman, *supra* note 20 (outlining the mental capacity of a gunman, who went into a Texas house and worship with his own weapons).

<sup>160</sup> See Greenberg, *supra* note 31 (discussing the technological pitfalls of smart guns, but exploring whether these pitfalls could be a weakness in a mass shooters scheme).

<sup>161</sup> See Greenberg, *supra* note 31 (explaining that a person executing a mass shooting could have the technology used against him, which could stop him from committing a mass shooting if the police are armed with jammers).

<sup>162</sup> See Greenberg, *supra* note 31 (discussing the ways that smart guns could potentially help mass shootings).

<sup>163</sup> See U.S. CONST. amend. II, *supra* note 34 (granting citizens the right to bear arms).

<sup>164</sup> See *Heller*, *supra* note 34, at 636 (reasoning that “the enshrinement of constitutional rights [like the right to bear arms] necessarily takes certain policy choices off the table” including “the absolute prohibition of handguns held and used for self-defense in the home”). “Undoubtedly some think that the Second Amendment is outmoded in a society where our standing army is the pride of our Nation, where well-trained police forces provide personal security, and where gun violence is a serious problem.” *Id.* “That is perhaps debatable, but what is not debatable is that it is not the role of this Court to pronounce the Second Amendment extinct.” *Id.*

<sup>165</sup> See *McDonald*, *supra* note 58, at 773 (enumerating the Second Amendment rights to the state government).

<sup>166</sup> See *Hightower*, 822 F. Supp. 2d at 46 (discussing that the right to bear arms is not an unlimited right).

an unconstitutional limitation that infringes the right to bear arms under the Second Amendment.<sup>167</sup>

For smart gun advocates, implementing this technology is a reasonable step to regulate gun violence.<sup>168</sup> Smart guns are safer for the general public while qualified gun owners can still own guns.<sup>169</sup> This safety measure could help deter future mass shootings.<sup>170</sup>

Alternatively, smart guns could be viewed as unconstitutional under the Second Amendment.<sup>171</sup> *Heller*, *McDonald*, and *Hightower* enumerate the right to bear arms.<sup>172</sup> *Heller* notes that the right for citizens to protect themselves in their home is paramount.<sup>173</sup> However, smart gun technology is imperfect; if this technology is mandated but fails, the state or federal governments would be impeding on Second or Fourteenth Amendment rights because it would fail to provide citizens with the most essential right enshrined in the Second Amendment: self-preservation.<sup>174</sup>

Plore's discoveries make it clear that RFID is not an effective means to secure a firearm.<sup>175</sup> Companies like Armatix and Mossberg

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<sup>167</sup> See Mohan, *supra* note 100 (explaining how smart gun features may be an effective way to make firearms secure and reduce violence).

<sup>168</sup> See Mohan, *supra* note 100 (opening the door for the conversation into the benefits of smart guns).

<sup>169</sup> See Mohan, *supra* note 100 (stating that smart guns could reduce violence).

<sup>170</sup> See Mohan, *supra* note 100 (advocating for the adoption of smart guns to save lives and listing the reasons smart guns are currently inhibited). The author notes a growing reluctance from the gun industry to innovate, but also explains that firearms are not inherently engrained into the culture of venture capitalism. *Id.*

<sup>171</sup> See ATWOOD, *supra* note 32 at 17 (discussing the balance between reasonable and unreasonable regulations and restrictions on firearms).

<sup>172</sup> See Hullinger, *supra* note 30 (describing the *Heller* decision and its effects on the proposed smart gun movement).

<sup>173</sup> See Hullinger, *supra* note 30 (expanding on the decision where Justice Scalia mandates that the right to bear arms is an inherent right that should not be infringed).

<sup>174</sup> See U.S. CONST. amend. II, *supra* note 34 (upholding the right to bear arms); see also U.S. CONST. amend. XIV, *supra* note 35 (barring states from withholding federally granted rights); see also *Heller*, *supra* note 34, at 592 (enumerating the right to bear arms as a form of protection and preservation, which is a fundamental right under the Constitution); *McDonald*, *supra* note 58, at 773 (explaining how the Fourteenth Amendment protects the right to be safe and protected from governmental tyranny or expulsion of rights).

<sup>175</sup> See Greenberg, *supra* note 31 (noting the glaring flaws that make RFID smart gun technology generally unsafe because of the ease in which one can manipulate the technology).

advertise these weapons as safe to protect one's life and property.<sup>176</sup> However, a high-tech criminal could certainly build a transceiver to block a smart gun's firing mechanism, which leaves the gun owner defenseless in his own home.<sup>177</sup>

The right to live in peace is an embedded right for the citizens of the United States.<sup>178</sup> Mass shootings are the antithesis of public safety.<sup>179</sup> Mandating smart guns is unconstitutional on the grounds of public safety because the shortcomings of smart guns would compromise the integrity of the firearm.<sup>180</sup> This would jeopardize the safety of the user and hinder protective measures.<sup>181</sup>

The high number of weapons that exist in the United States raises an important obstacle to proposed smart gun legislation.<sup>182</sup> It is not logistically possible to implement smart gun technology to firearms currently in existence.<sup>183</sup> There are over 350,000,000 guns in the United States and only an infinitesimal number of these firearms are smart guns.<sup>184</sup> To implement, there would have to be a mass recall

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<sup>176</sup> See Mossberg, *supra* note 48 (describing the companies that have invested in smart gun technology); see also Mohan, *supra* note 100 (discussing the contributions by both companies while discussing possible venture capitalist investment in smart gun software).

<sup>177</sup> See Greenberg, *supra* note 31 (alluding to how a person that will potentially use the smart gun for a negative purpose could compromise the integrity of the security system).

<sup>178</sup> See Heller, *supra* note 34, at 616 (describing the "indispensable" right that is guaranteed through the Fourteenth Amendment).

<sup>179</sup> See Mohan, *supra* note 100 (discussing multiple mass shootings that are certainly against the health, safety and welfare of citizens of the United States).

<sup>180</sup> See Heller, *supra* note 34, at 616 (stating the importance of the Second Amendment is self-preservation); see also Greenberg, *supra* note 31 (expanding upon the vulnerabilities of smart gun technology).

<sup>181</sup> See Greenberg, *supra* note 31 (noting that smart guns, as they exist today, are not safe enough). "[I]f smart guns are going to become a reality, they'll need to be smarter than this one." *Id.*

<sup>182</sup> See *Smart Gun Symposiums*, *supra* note 50 (outlining the specific rates of firearms that are estimated to be in the United States today).

<sup>183</sup> See ATWOOD, *supra* note 32, at 112 (discussing the hardship of retroactively requiring the use of smart guns when so many non-smart guns are already in circulation).

<sup>184</sup> See ATWOOD, *supra* note 32, at 20 (showing the consequence of the huge number of guns that are not equipped with the most recent security technology, and why it is not feasible to equip all of the firearms in the United States with this safety measure).



of these millions of guns.<sup>185</sup> Even if this was possible, converting each gun into a smart gun would temporarily disrupt the firearm ownership.<sup>186</sup> This would be an obvious infringement of the Second or Fourteenth Amendments.<sup>187</sup> If only new guns were smart guns, their impact would be marginable at best.<sup>188</sup>

Smart guns that utilize Glockchain may be more viable.<sup>189</sup> Glockchain would make it possible to have a real time ledger on when shots are fired and by whom.<sup>190</sup> If firearms had this ability, mass shootings could become dramatically different.<sup>191</sup> The technology is useful in mass shootings because shooter identity is paramount.<sup>192</sup> Glockchain could identify metrics, such as response time, quantity of shots fired, identity of the shooter and the location.<sup>193</sup> While these metrics could be important to improve policing and responses to mass shootings, they would not prevent mass shootings.

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<sup>185</sup> See ATWOOD, *supra* note 32, at 112 (noting the difficulties that comes with attempting to get the country on board with the requirement of using smart guns).

<sup>186</sup> See ATWOOD, *supra* note 32, at 124 (describing the Second Amendment, and why depriving citizens of the rights to their guns exposes them to be taken additional rights away).

<sup>187</sup> See Heller, *supra* note 34, at 635 (explaining how taking someone's gun is against the Second Amendment because it directly impedes with the right to bear arms); see also McDonald, *supra* note 58, at 773 (discussing why taking away the Second Amendment impedes on the Fourteenth Amendment).

<sup>188</sup> See ATWOOD, *supra* note 32, at 21 (outlining the sheer mass of guns that are currently in the United States, which alludes to the fact that someday there may be over a half of a billion guns in the United States without this technology); see also Greenberg, *supra* note 31 (discussing the technological components of smart guns). If the government mandated that conventional firearms have to be converted into smart guns, they would have to install this technology into the weapon itself. *Id.*

<sup>189</sup> See Schwartz, *supra* note 28 (describing the potential to use blockchain technology in a system which creates accountability for the discharging of a firearm).

<sup>190</sup> See Schwartz, *supra* note 28 (describing glockchain technology).

<sup>191</sup> See Schwartz, *supra* note 28 (giving credence to the argument that glockchain technology could locate unauthorized access by identifying where a weapon incorporated with the technology is located). Glockchain technology would be able to record every shot and that record is not able to be altered after it is made. *Id.*

<sup>192</sup> See Schwartz, *supra* note 28 (discussing the applicability of the software with police departments).

<sup>193</sup> See Schwartz, *supra* note 28 (exemplifying the data that could be collected from glockchain technology).

President Barack Obama's executive order mandating smart guns for law enforcement is not fundamentally sound.<sup>194</sup> The glaring vulnerabilities of RFID smart guns leave susceptibility for disastrous results.<sup>195</sup> The Kloepper biometric prototype, which is ineffective when the gun owner's hands are dirty or wet, could be similarly disastrous.<sup>196</sup> Federal officers are often in situations where their fingerprint would be dirty or wet, and if this technology is implemented a firearm may not work when it is needed most.<sup>197</sup> This raises concerns of public safety.<sup>198</sup> If a smart gun is not reliable in the line of duty, then they jeopardize the safety of the people they are meant to protect.<sup>199</sup>

## V. Conclusion

Americans have a right to safety. Smart guns cannot stop mass shootings. One of the greatest blunders in innovation is pushing imperfect technologies on users that do not want them. Smart guns are imperfect, and even if they appear safe, the people in this country do not want them. To be effective in the fight against gun violence, regulation and innovation must be combined. Regulation cannot be outright prohibition; the rights of the people must be maintained, and the Second Amendment must be upheld for the integrity of our Constitution.

Change must come from common-sense federal regulations. For supporters of the Second Amendment, firearms are a right so heavily engrained in American society and culture that they encompass the American spirit. For anti-gun advocates, the Second Amendment is a dated mantra enforced without regard for human life.

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<sup>194</sup> See *Baseline Specification*, *supra* note 99 (discussing President Barack Obama's executive order for federal employees to carry smart guns).

<sup>195</sup> See Greenberg, *supra* note 31 (breaking down that smart guns for law enforcement are dangerous because of the shortcomings of the technology).

<sup>196</sup> See Gammon, *supra* note 27 (exposing that the biometric security function falls flat from a common occurrence in the field of getting wet or dirty).

<sup>197</sup> See Gammon, *supra* note 27 (raising the issue that a federal official might not be able to use his service revolver during the time that he would need it most).

<sup>198</sup> See McDonald, *supra* note 58, at 854-55 (revealing that the constitutional issue raised is whether the Fourteenth Amendment protects those rights guaranteed by the Second Amendment).

<sup>199</sup> See McDonald, *supra* note 58, at 573 (recognizing that the right to bear arms under the Second Amendment is fundamental).

We need baseline federal regulations that allow citizens to have firearms while still holding them accountable.