



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

<b>Name(s)</b> <b>Rahul Sharma</b>	<b>Project Number</b>  38795
<b>Project Title</b> <b>Surgery Avoidance Using an Inductively Charged Pacemaker</b>	
<b>Objectives/Goals</b> The objective is a proof of concept to show if induction charging can be used on a pacemaker reliable, safe, and at what range to show if it is a better alternative than a surgical battery replacement. Another goal is to show the range the charge can go through with different materials in between to simulate the different densities inside the body. <b>Abstract</b> <b>Methods/Materials</b> Using a Wireless Transmitter P9038-R-EVK, I paired it up with the Wireless Power Receiver P9025AC. Then power is given to the transmitter via cable so that it can create the oscillating magnetic field. I created a pulse generating circuit from a common breadboard, wires, resistors, capacitors, and an IC-555 chip. This served as the replacement for the circuits found in a pacemaker. After soldering the breadboard and receiver together I tested the range using multiple materials in between the charge to see how it affects the range. This was to simulate the different types of materials and densities the magnetic field had to pass through. <b>Results</b> The results were successful. With Air in between the range of the prototype was 29 millimeters. This is impressive considering the top of the line induction chargers for their phones only have a range of at most 5 mm. I found that wet newspaper has a close density to flesh and skin, and the range of the wet newspaper was 21.5mm. The results show it can be used accurately with a good range to charge the pacemaker from the exterior, and the magnetic field can pass through with little to no resistance. <b>Conclusions/Discussion</b> The goal is to create a cheap and effective wireless charging pacemaker that can eliminate the need for surgery. The data showed that even with wet newspaper (similar density to muscles and skin) the range was 21.5mm. According to the CEO of Groove Mobile, #Induction Charging is hundreds of times safer than making a cell phone call. In conclusion, this device has good range, is extremely safe, and reliable, and it is clear that surgery for the elderly every 5-10 years is not the way to go. The inductively charged pacemakers will save countless of lives that could otherwise be lost in a surgical battery replacement and saves the cost of the surgery. In fact, if this technology were implemented in every single pacemaker right now, then we can save up to 70 billion dollars in medical expenses.	
<b>Summary Statement</b> I devised a way to charge the pacemaker from the exterior using a induction charger with a range of 29mm, which will save the costs, and lives of unnecessary surgery.	
<b>Help Received</b> I made the project myself I just needed parental help to purchase all the electronic components.	