



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> Daelin T. Arney	<b>Project Number</b>  34396
<b>Project Title</b> M.A.P	
<b>Objectives/Goals</b> The purpose of this project was to create a prosthetic forearm that could utilize synthetic muscles, operate off of a biometric system, and be made inexpensively. I based this design off the concepts of my previous years project P.A.M (Pneumatically Augmentable Muscle). My present project by the name of M.A.P (Maximum Articulation Prosthetic) relates to P.A.M in the fact that it uses artificial muscles to actuate, instead of present day standard servo motors or hydraulics. However the distinct dilation of this model to the prior is that of the method of actuation.M.A.P requires and raw electrical impulse to actuate the muscle, and in turn articulate the prosthetic. <b>Abstract</b> <b>Methods/Materials</b> After a period of study it became apparent that a number of aspects pertaining to M.A.Ps construction had to be revised. For instants the original design called for ten muscles (two per finger). The revised version calls for five muscles (one per finger). Each muscle would only preform subduction and there would be an elastic band that would abduct the finger when flexion is ceased. A more developed version of M.A.P will also allow for a suspension system within the arm that would allow for the Patient to support their body weight on the prosthetic its self. This would solve the ultimate problem of both comfort and strength related to weight capacity. <b>Results</b> M.A.P operates using a three stage computing method, as shown in (E). First the muscle sensor (red board in E) receives electrical impulses from the digatorums located in the forearm threw medium of electrodes. These are the muscles used to actuate our natural fingers. Once the sensor receives the signal it then translates that signal into a rectified signal. Once this is obtained it is then relayed to the MCP 3208 p in the bread board this chip applies voltage values. These voltage values are then corresponded to the propeller board which tells which muscle to flex. <b>Conclusions/Discussion</b> This project is not yet finished and as a result of that concluding data cannot be provided. Although the research to date is showing promising potential and with time and experimentation the creation of M.A.P can become a reality. Hopefully one day M.A.P can be my first step at creating a piece of technology that will help improve and enrich a person#s life.	
<b>Summary Statement</b> To create a prosthetic that utilizes synthetic muscles and a biometric system	
<b>Help Received</b> Jeff Martin from Parallax Inc.	