



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Isabel E. O'Malley-Krohn	Project Number S1821
Project Title In Search of Planet 9: Locating through Computer Modeling	
Abstract Objectives/Goals Recently, two Caltech researchers, Batygin & Brown (2016), found possible evidence of the elusive Planet 9. This discovery began a race among astrophysicists to prove or disprove the theory or, as in NASA's case, actually spot the potential planet in the sky. I aimed to input parameters of the possible ninth planet in our solar system into a computer program to support or refute its existence. Methods/Materials Computer, Matlab, notebook. Created/Found physics equations to model our solar system with and without Planet 9. Wrote code and ran two separate simulations. Results The results do not support the hypothesis; the percent error of the data is greater with Planet 9 than without and although the system oscillates on the z-axis, it is either the same as astronomical data nor is it above the margin of error. Conclusions/Discussion The computer model was truer to astronomical findings when Planet 9 was not a force in the system. The fact of z-direction oscillation does suggest some anomaly in that direction. This means Planet 9 either exists, just not where the parameters placed it, or does not exist at all.	
Summary Statement Using Batygin & Brown's proposed parameters, I wrote a computer program that models Earth's solar system with and without planet 9 and found Planet 9 may exist but not with my specified parameters.	
Help Received Michael Saccone - UC Santa Cruz	