



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>George D. Morgan</b>	<b>Project Number</b> <b>S1417</b>
<b>Project Title</b> <b>Operating System Design and Development Continued</b>	
<b>Objectives/Goals</b> The objective of my project is to apply modern programming paradigms to in-depth operating system design and development.	
<b>Abstract</b>	
<b>Methods/Materials</b> ~ A target architecture. The ARM architecture. ~ An target ARM platform. The AT91SAM7S321. ~ A build environment. Mac OS X Mountain Lion. ~ An integrated development environment. Xcode. ~ A package manager for Mac OS X. Homebrew and MacPorts. ~ An ARM toolchain. The GNU ARM Toolchain ported to Mac OS X. ~ An application performance analyzer. Instruments.	
<b>Results</b> Locality of reference and differential inheritance, along with modern programming paradigms such as object orientation and polymorphism, have the potential to enable a given operating system to more efficiently manage its resources and handle jobs. Inefficiencies such as duplication of code in memory, redundant instruction execution, and incoherent structure can be combatted, or altogether eliminated, resulting in an operating system that performs more efficiently than a traditional, non-paradigmatic kernel.	
<b>Conclusions/Discussion</b> In conclusion, the application of modern paradigmatic programming to the design and development of an operating system framework, on top of the concepts of object-orientation and reflection, which were introduced in last year's study, resulted in a dynamic kernel environment capable of operating at a higher level of abstraction than any other operating system has for over 40 years.	
<b>Summary Statement</b> My project focuses on the application of modern paradigmatic programming to operating system design and development.	
<b>Help Received</b> None. All of the work done on this project was my own.	