



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Andrew C. Stanek</b>	<b>Project Number</b> <b>S1621</b>
<b>Project Title</b> <b>A Suite of Software Tools for Raman Spectroscopy</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The goal of this project was to create a suite of tools to facilitate Raman spectroscopy. This suite consists of two programs: the Nanoscanner, used for scanning a sample, and the Nanoanalyzer, used for interpreting the results.</p> <p><b>Methods/Materials</b> Labview was used to program the Nanoscanner, while Matlab was used to program the Nanoanalyzer. Both the Nanoscanner and the Nanoanalyzer were tested with the Raman spectrometer and real spectroscopy data sets, and potential users reviewed both programs for utility and user-friendliness. A NI Data Acquisition Unit and a standard PCI card were necessary to operate the Raman spectrometer itself.</p> <p><b>Results</b> Two versions of the Nanoanalyzer were released, and the final version included a variety of tools for analyzing spectroscopy data sets and a customizable interface. The Nanoanalyzer was able to load and handle large datasets extremely quickly with a minimum of system resources used. During numerous trials, the Nanoscanner approached the theoretical minimum time to complete a scan (median within 15% of the minimum) and completed scans of actual samples on the Raman spectrometer.</p> <p><b>Conclusions/Discussion</b> The Nanoanalyzer and the Nanoscanner, the two main components of the suite of tools, fulfill their design requirements and are extremely useful in the process of Raman spectroscopy. The suite of tools may be expanded in the future to further simplify and streamline data collection and analysis.</p>	
<b>Summary Statement</b> The purpose of this project was to create a suite of software tools to facilitate scientists' and researchers' use of Raman spectroscopy and to otherwise aid experimentation.	
<b>Help Received</b> My project was mentored and all equipment provided by Dr. P. James Schuck, Staff Scientist, Molecular Foundry, Lawrence Berkeley National Laboratory, under its Center for Science Research and Engineering Education's High School Summer Research Participation Program.	