



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) Richard D. Johnson	Science Fair Use Only S0508
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Using Hyperspectral Remote Sensing to Locate Iceplant along the Central Coast of California	Division <u>S</u> Junior (6-8) <u>S</u> Senior (9-12)
Preferred Category (See page 5 for descriptions.) 5 - Earth Sciences/ Planetary Sciences/ Physical Environments	
Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges. <p>Invasive species, such as iceplant, are a problem for California's native vegetation because they are constantly destroying the native vegetation. To help the native vegetation, hyperspectral remote sensing may provide a way to accurately locate iceplant. This would make it easier and more efficient for groups that wish to help the native vegetation to do so by removing the iceplant.</p> <p>To see if this is feasible, Hymap hyperspectral remote sensing data was analyzed to first find the spectrum of light that iceplant reflects in the ultraviolet, infrared, and visible spectrums. The spectrum was found by first locating a site in person; then locating the pixels that represented this site, and then finding the spectrum of these pixels. The spectrums of other groups containing similar pixels were then found. This enabled the creation of a spectral angle map, which grouped all ungrouped pixels with the group that were the most similar. This provided other pixels that would possibly be iceplant. In addition, the iceplant spectrum was used to create a matched filter classification map. This map used only the iceplant spectrum and classified pixels that had spectrums similar to the iceplant spectrum.</p> <p>The maps were then compared, and pixels that should contain iceplant according to both were located to see if they did in fact contain iceplant. While some of these locations did contain iceplant, many contained nothing but grass. This showed that hyperspectral was not proven to accurately locate iceplant.</p>	
Summary Statement (In one sentence, state what your project is about.) This uses hyperspectral remote sensing to locate iceplant along the central coast of California.	
Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Supervised by Daniel Welsh-Bon and used Dr. Potts lab at UC Santa Cruz.	