INTRODUCTION
Global ice contains a wealth of information about past climate, geologic events, and biological activity. Much of this information can be obtained through the analysis of the particles and gases trapped in this ice. The goal of this project is to develop a rapid method to characterize both biotic and abiotic particulates in samples from glaciers. This system will allow us to run a large volume of glacial samples in a short amount of time. This type of standard analysis procedure will process large amounts of data into parameters that can be used to quantitatively describe particle distributions.

METHOD TESTING
The flow cytometer was tested using a variety of methods. Polystyrene calibration bead standards were used, as well as stained samples of cultures from bacteria isolated from glaciers. Comparisons were made between the results of the flow cytometer and the results of epifluorescent microscopy.

DATA COLLECTION
The ice samples are analyzed using a flow cytometer, a laser particle counter. This device obtains data describing particle sizes and concentrations. The counter can be used in conjunction with a fluorescent stain to analyze biological aspects of the particles. Nucleic Acid stains have been used to distinguish between biotic and abiotic particulates. The resulting output consists of two different particle size distributions, a biotic distribution and an abiotic distribution.

In order to analyze the samples, they must be melted and treated with SYTO 60, a red fluorescent stain. The solution is placed in a one millimeter tube, and analyzed in the machine.

DATA ANALYSIS
Through research and literature review, it was found that these size distributions could reasonably be fit to distribution curves. Waterfall distributions tended to fit the data best. A curve fitting procedure was developed to analyze and describe the raw data that was output by the flow cytometer.

DISCUSSION
The data acquired from the Lake Vostok samples were studied using this curve fitting technique. Numerical descriptions of the distributions were obtained.

FUTURE WORK
This preliminary work is intended to allow for the future use of this system in the analysis of ice samples from Arctic and Antarctic regions. We hope to be able to couple this system to a chemical analysis system that is currently in use at the Desert Research Institute in Reno, NV. This automated system analyzes ice samples continuously and very rapidly.

When our system is ready, we will attempt to couple it to this chemical analysis system. This has the potential to offer valuable information about the ecosystems contained in glacial ice, and climate changes throughout geologic history.

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