



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Emily Jane Stover	Project Number 22325
Project Title Solar Powered Micron-Sized Contaminator Filtering Mailbox	
Abstract Objectives/Goals My objective is to build a system inside a regular household mailbox that can filter mail that has been "cross contaminated" by Anthrax particles. Anthrax spores are one micron in size and a typical micron filter can capture these dust like particles. A renewable energy source is used to support the system. Methods/Materials To design this product, I had to over come several obstacles; 1)How to get particles off envelopes 2) How to develop a filtering system 3)How to get the particles to the filtering system 4) How to power all these functions at a location removed from a homes source of electricity. The rural type mailbox contains a perforated drum that spins much like clothes dryer. The particles fall to the bottom of the mailbox. A fan--on a timer-- blows this fallen dust to the back of the mailbox through a funnel and into a removable micron filter. The moter that spins the drum and the fan are powered by renewable solar energy. The system was tested by weighing the powder substance--baby powder was used as a sample because it is one micron--before putting it on the envelopes. The envelopes were then spun and filtered. The powder in the filter was weighed. Results The system was tested 25 times with the timer set between five minutes and 30 minutes. At five minutes, zero grams of powder were recovered. At 30 minutes I was able to recover 30 percent of the powder measured in grams. Conclusions/Discussion The moderate success of this mailbox suggests that there are preventive methods individuals can use to remove contaminates from mail. Continued product improvements such as larger fans and more sophisticated aerodynamic designs are being tested to achieve higher success rates. I am continuing to study the cost effectiveness of the personal preventive method versus the corporate postal service's reactive method.	
Summary Statement I built a filtered mailbox system that eliminates the contamination of mail by small particles containing diseases.	
Help Received Dad explained mechanical advantage. Borrowed a scale from Dad's work. Talked to engineers Eric Vaughn and Tony Fink about testing results.	