

# ISEF allows students to explore endless questions

MARY EARP

How much bacteria do water fountains have? Is the boys' bathroom cleaner than the girls'? How are our feelings affected by our environment? These questions are among the many that students will explore through the International Science and Engineering Fair.

Ann Bernert, senior, is pursuing a project on a biological control program for the Himalayan Blackberry. She recently received a very prestigious award and was recognized as a semi-finalist in the Intel Science Talent Search program. From the 1,744 entrants in this competition, only three other Oregon students stand with Bernert as semi-finalists, and only 300 seniors received this title across the country. Bernert received \$1,000 from the Intel Foundation with an additional \$1,000 going to West Linn High School.

Bernert has been working on this project since freshman year. This year, she is focused on the endophytes, the microscopic fungi that live inside of plants.

Bernert has faced many difficulties with this project, including the amount of time it takes to experiment and the range of the field in which she is working.

"Conducting this research takes a lot of time and resources. It also requires a lot of experience in order to make sure experiments run smoothly. Making sure data will be conclusive is sometimes very difficult," Bernert said. "The hardest part about working in mycology and working with endophytes is that they are a very new field of study so there isn't very much known about them at all."

Bernert's original inspiration for this topic was to find a way to control invasive blackberries that she had to remove from her family's farm. Though this drove her at the beginning, she has now found motivation in the fact that not much is known about her topic.

"After doing three years of research about this, I became intrigued by how much was unknown about plant pathology and mycology and I was inspired to find all this unknown info out," Bernert said.

Bernert recently began experimenting, and her first phase of experimentation is to identify blackberry endophytes, or fungi that live inside and in between

plant cells that kill other fungi.

"This experiment sets up two species of fungi so that the rate at which one of them kills the other can be observed," Bernert

affect the world around me," Bernert said.

Bernert experiments at the North Willamette Research and Extension Center. She cites her mentor, Luisa Santamaria,

bacteria that oxidize manganese to remove arsenic from drinking water. People have done this before, but I'm trying to improve it so that it removes a higher

way I had expected."

The experimenting process often poses as the main problem for ISEF participants, whether it be problems in the results or in carrying out the experiment. Spencer Chang, junior, is among those who have had troubles with their experiments.

"The biggest difficulty I am facing is finding the right labs that can support this type of research," Chang said. "The other major difficulty is finding the right methods to carry out in my experimentation. I've had to call many professors around the country to chat and give feedback about my project."

Chang is conducting experiments about *Pseudomonas aeruginosa* biofilms and is attempting to find novel therapeutic approaches to their persistence in chronic infection in cystic fibrosis patients.

"Biofilms are a surface attached community of cells encased within a self produced polysaccharide matrix. They behave much differently from the usual planktonic bacterial cell, and their complex aggregation makes them almost impossible to eradicate," Chang said.

In simpler terms, Chang is attempting to find a cure to *Pseudomonas aeruginosa* biofilm infections in cystic fibrosis patients, the main cause of their deaths. There are currently few cures for this, and Chang is attempting to find more reasonable ways of approaching it.

Chang has faced difficulties in finding labs and information on this topic.

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continued on page 8

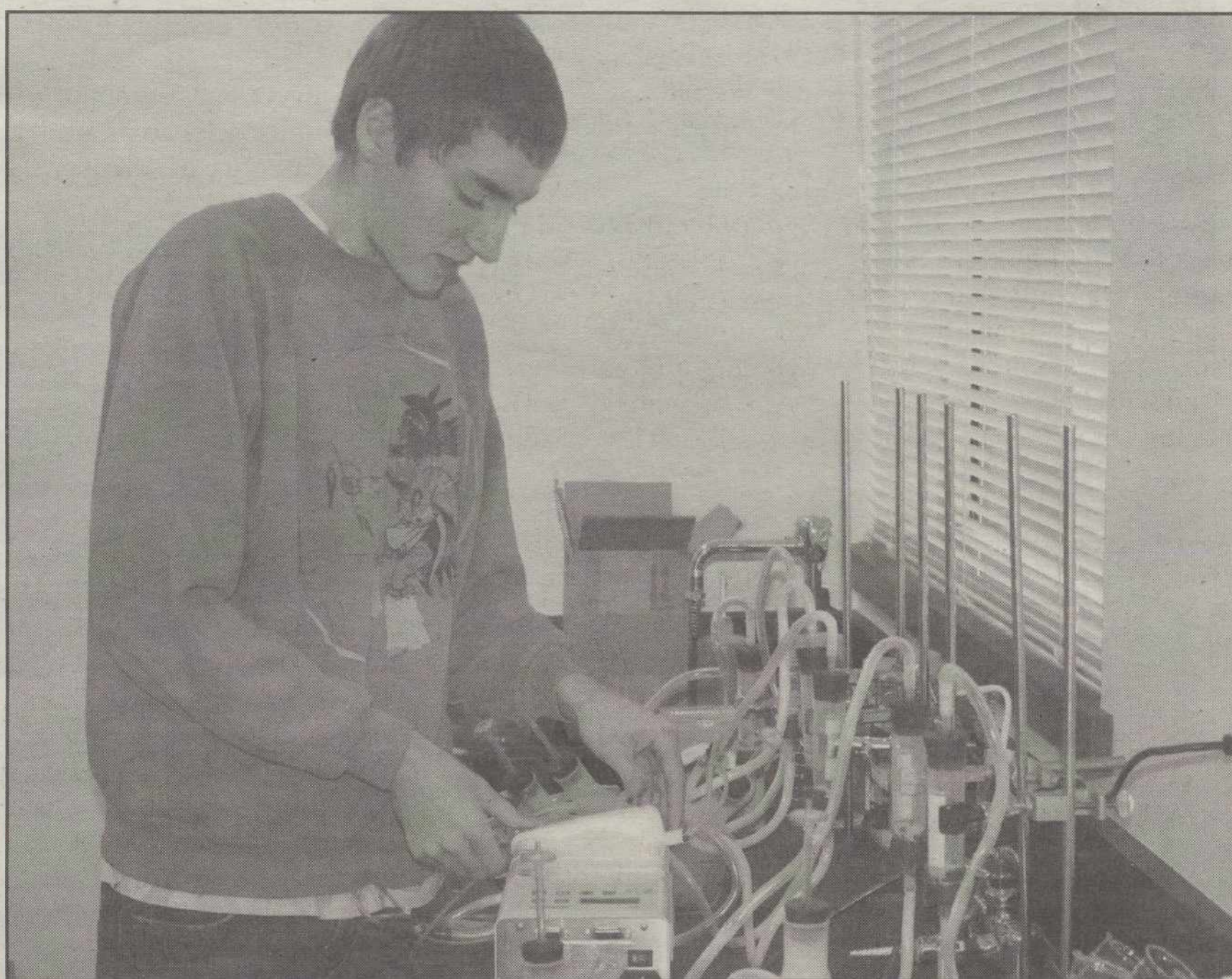


Photo by Mary Earp

Graham Frank, senior, sets up his filtration system for his project in order to remove arsenic from ground water. Frank, along with many others students, have been working on their ISEF projects which will be showcased on March 4.

said. "Then, I will select the endophytes that are most antagonistic, or that can kill other fungi most efficiently, and try to create a new way to research them similar to the method I developed to research rust fungi."

According to Bernert, depending on how far she takes the project, she could be pursuing it for eight to 20 years. Though this is a long time, Bernert finds it more than worthwhile.

"My project is applicable to the real world. Not only do I find mycology and plant pathology fascinating, I know it can positively

extension researcher for Oregon State University at the North Willamette Research and Extension Center, and Amy Schauer, ISEF coordinator, as providing essentials. According to Graham Frank, senior, Schauer has also been a big help to him with his ISEF experiment.

Frank is working on a project about removing arsenic from drinking water. Though this project has been attempted before, he is working toward creating a more efficient process.

"I'm trying to use

concentration," Frank said.

Frank's original inspiration for this project was sparked by his summer internship when he found out that manganese oxides can remove contaminants like arsenic, chromium and selenium. Although Frank has been working diligently on his project, he has faced a few barriers along the way.

"My difficulties so far have been trying to keep the costs down because of budget cuts this year," Frank said. "Also, the bacterium that I'm planning on using isn't culturing the

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