

APPLES IN ORBIT

STUDENTS HELP NASA IN HUNCH PROGRAM

When Christopher Beyrouy stepped out of his classroom to take a phone call last September, he could never have imagined the opportunity that was about to present itself.

“Hi, this is Florence Gold from NASA,” said the voice on the other end of the line. “I’m calling to see if you and your students might

be interested in being part of our extreme science program.”

The Wapato High School engineering teacher and Heritage graduate recalls the bell ringing at that moment and his 11th- and 12th-graders leaving the classroom.

When the conversation ended an hour later, Beyrouy knew he and his students were about to experience something huge.

Not only would they be working with NASA, but before the year was out, Beyrouy and nine of his students would be headed to Houston for a hands-on learning experience with the space program.

For a man whose passion is learning and whose inspiration comes daily from the young people he teaches, this would be a dream come true.



THE NASA CREW PICTURED LEFT TO RIGHT: ALONDRA MARTINEZ, ROSAISELA TREJO-PEREZ, ESTABAN VELAZQUEZ, BRANDON NEZ, CHRISTOPHER NINATANTA AND JOANNA TORRES. CREW MEMBERS NOT PICTURED: ANGELA DOSONO, CHELSEA DELOZIER AND SHELIAN LAME BULL.

The Path to the Classroom

Beyrouthy has led the way for many of his students, but his path to the classroom did not take a direct route.

“I wanted to be a physicist, but then I decided on architecture,” he said. “I was working as a draftsman, and one day when I was helping my sister-in-law with her math, my wife said to me, ‘Have you ever thought about going into teaching? You’re so patient. You try different ways to teach.’”



ALONDRA MARTINEZ WAS ONE OF FOUR WAPATO HIGH SCHOOL STUDENTS TO GET TO EXPERIENCE MICROGRAVITY WHILE THEY TESTED THEIR NASA EXPERIMENT.

“Everyone at NASA was so impressed with our line of thinking and research that they have added our idea to their design and prototyping program. So the students will get to continue their research.”

Beyrouthy was intrigued by the idea. He enrolled at Heritage University and, two years later, walked out with his teaching certificate.

In the nearly 20 years since, Beyrouthy has involved his students in innovative programs like *For the Inspiration and Recognition of Science and Technology (FIRST) Robotics*, which has students design, build and compete with robots that perform set tasks. His goal is to provide educational outlets that offer significant hands-on learning

opportunities to students that excite and engage them in their education.

His effort to consistently go the extra mile is part of what caught the attention of HUNCH — “High School Students United with NASA to Create Hardware” — the program Gold introduced him to that September day.

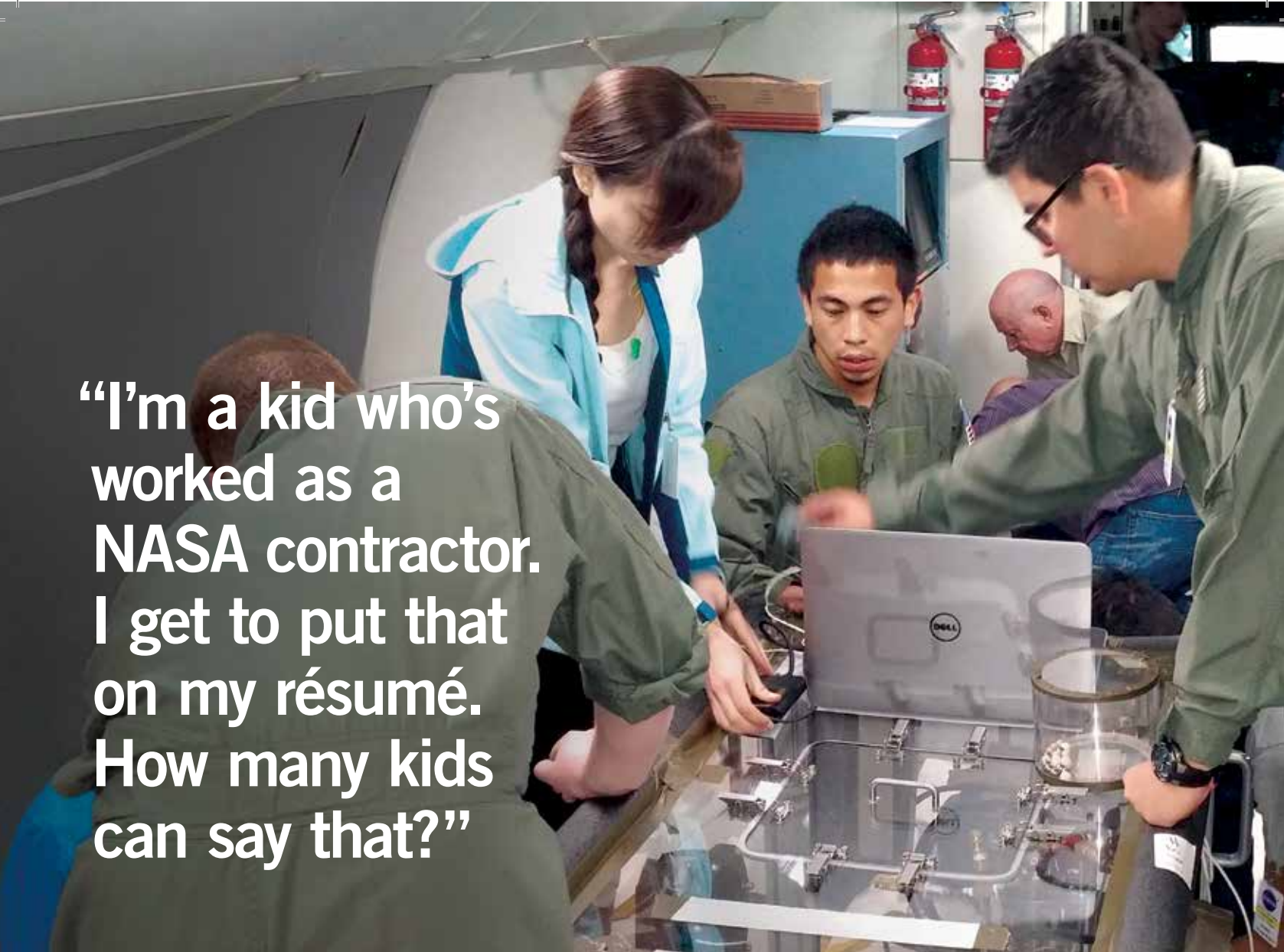
A partnership between NASA and educational institutions nationwide, HUNCH allowed students to design and fabricate products for possible use on the International Space Station.

Inspiration From the Valley

Beyrouthy and his students found the inspiration for their project right here in the Yakima Valley.

“One of the things we learned about the astronauts’ experience in space is that they get fresh fruit at the space station, but it goes bad after a week,” he said. “For their project, the students said they wanted to figure out how to keep fruit fresh in space for a year or more.”

They also wanted to find a way to package apples in smaller numbers, just a few at a time, so that the astronauts



“I’m a kid who’s worked as a NASA contractor. I get to put that on my résumé. How many kids can say that?”

wouldn’t have to eat eight or 10 apples upon opening a single container.

Working with Yakima Valley companies like AgroFresh, the students learned that the faster apples respire, the more ethylene is produced, and the faster apples ripen. Cold storage reduces the apple’s respiration, thereby reducing the amount of ethylene produced and slowing or halting the ripening process. The apple is basically in hibernation.

“They lower the temperature and the oxygen and increase the carbon dioxide to put apples in a hibernation state,” said Beyrouy. “They can stay dormant for a year.”

The students needed to create a

microgravity experiment to test whether a similar process would work in space. They designed a container, nicknamed CARS, for Controlled Atmosphere Room Simulator, with a specific mix of carbon dioxide, nitrogen and oxygen, and tested it to see if the gases would stratify.

On the ground in Wapato, the experiment worked; the gases showed no signs of separation. The next step was to travel to Houston and repeat the ground experiment. They would then put the CARS in the microgravity plane and learn whether the results would be the same.

In all cases, the final test results were the same; the gases did not



BEFORE TAKING THEIR EXPERIMENT UP INTO THE MICROGRAVITY AIRPLANE FOR TESTING, THE CREW HAD TO FIRST ASSEMBLE IT ON THE GROUND FOR INSPECTION BY NASA SCIENTISTS FOR APPROVAL TO MOVE ON TO THE NEXT STAGE.

things like the need for additional parts. And four lucky Wapato seniors flew in a microgravity plane.

Once back in Wapato, the students presented their data to NASA via Web teleconference, with NASA researchers, HUNCH leadership and other participating HUNCH schools and their supporters all tuning in to hear the results. Each group of students presented what they were researching, and explained why they had selected their experiment, what their results were and what their next steps would be. This was followed by key people from NASA posing questions.

Budget cuts have meant NASA

not lost on Beyrouthy's students.

The future plans of many of the six girls and three boys who comprised the team have changed because of the experience. Joanna Torres is a freshman at Heritage, studying computer science. Shelian Lame Bull, who gave up participating in a sport to be involved in the project, is focusing on being a lawyer for NASA. Christopher Ninatanta, who did all the computer programming and analysis of the data for the experiment, is looking into aerospace engineering. Estaban Valezquez wants to study aerospace engineering in college.

"I'm a kid who's worked as a NASA contractor," said Valezquez.

“My goal isn’t to turn every one of these students into engineers. It’s to get them to see everything that’s out there.”

separate. This meant that the students could now focus on designing a system that would maintain the gas mixture in microgravity and hopefully keep the apples fresh for a longer time.

On to Houston

On April 23, Beyrouthy, two adult mentors and nine students flew to Johnson Space Center in Houston. Their flight would ultimately be out of NASA Hanger 990 at Ellington Field.

Two students were on the ground at Ellington, putting the experiment together. Three students were standing by as a support crew to handle

has been forced to retire the HUNCH Extreme Science Program in recent months, Beyrouthy said.

"But everyone at NASA was so impressed with our line of thinking and research that they have added our idea to their design and prototyping program," he said. "So the students will get to continue their research."

Résumé: “NASA Contractor”

Designing microgravity experiments for NASA is something no school west of the Rockies is involved in, and fewer people have flown in microgravity than have climbed Mount Everest.

The rarity of this experience is

"I get to put that on my résumé. How many kids can say that?"

"They're seeing opportunities," said Beyrouthy. "My goal isn't to turn every one of these students into an engineer (though my dream would be to solve all the world's problems through engineering). It's to get them to see everything that's out there."

Ask Beyrouthy what it's like to experience microgravity, and he says he can't tell you.

"I wish I could, but I didn't go up," he says. "It's the kids who get to explore and follow the research and try to answer a question nobody has asked before." 🐦