

Bend native creates space-age tire

Spurred by internships with NASA

By MICHAEL KOHN
The Bulletin

Growing up in Bend, Calvin Young had all sorts of interests. He was passionate about science, math and music. Later he pursued philosophy. Engineering was never really part of the picture.

Then a chance encounter while working at a coffee shop in Portland introduced him to the world of engineering, and his inventor spirit was unleashed. Today he's producing his very own space-age tire invention that he hopes will one day replace inner tubes and make flats a thing of the past.

Young's invention, the METL tire, is modeled on the same technology developed by NASA for rovers to be used on missions to Mars or the moon. Young thought the sturdy tire has Earth applications too and during the summer of 2018 came up with a design that would work for bicycles.

The METL tire is non-pneumatic, that is, it doesn't require air. It holds its shape thanks to tightly woven interlocking springs. The metal springs are encased in polyurethane, and a durable outer tread adheres to the tire.

Non-pneumatic bicycle tires — also called airless tires or flat-free tires — already exist but are not widely used because testing has proven most brands to be too stiff compared to regular tires with air.

Young, who graduated from Summit High School in 2007 and Portland State University in 2012, was likewise not satisfied with what was available on the market.

"They tend to do a poor job absorbing bumps on the road," he said.

Then came summer internships at NASA's



Bend native Calvin Young adapted the Mars rover tires into airless bicycle tires.

Glenn Research Center in Cleveland in 2017 and 2018. He was working with engineers on designing wheels for rovers. The type of tire being developed was airless and uses a shape-memory alloy that springs back to its original shape after being deformed.

"Colleagues suggested that I take it further and explore new applications," said Young.

Young set about creating a new tire that he could fit on his commuter bike, a single-speed Schwinn he bought in Bend years earlier. "I decided it would be the perfect test rig for a new design," Young said. "The process involved a lot of hands-on experimentation, and there was an 'aha!' moment halfway through when I realized I had hit on a working design."

Young applied for a patent for the tire. Two other NASA engineers, Colin Creager and Santo Padula, were also credited as co-inventors for their work on the rover tires that opened the door to Young's bike tire invention. The patent for the tire drew the attention of two

entrepreneurs, Earl Cole and Brian Yennie. The pair had already created a company called Smart Tire with the intention of bringing new designs to market. Young's design was a perfect match.

"We first had an interest in the automotive version of this technology, and were preparing to create a bicycle version but then learned that a bicycle version already existed that was co-invented by Calvin and two other NASA engineers," said Cole. "We were glad to hear that and immediately knew its potential."

Smart Tire is now fundraising for product development and is slated for sale in 2022. More than \$1.2 million has been raised so far. A Wefunder page allows anyone to contribute. The investors give Calvin credit for the company's success so far.

"Calvin has been amazing. He works very quickly and diligently," said Cole. "He was able to build our first bicycle prototype, METL, in no time, and we look forward to the next iteration."

The investors hope the

technology can be applied to other uses too, and have plans to develop tires for cars, trucks and airplanes.

"The bike tire will be a launchpad for tackling the industry as a whole," said Young. "Replacing inflatable tires onto ground and air vehicles promises to have a huge impact on fuel efficiency and fleet reliability — and our goal is nothing less than revolutionizing the transportation sector."

Those big aspirations had modest beginnings in Bend, where his family settled after his father took an engineering job in Redmond with Precision Castparts Corp.

Young attended Elk Meadow Elementary School and Cascade Middle School. He still has fond memories of riding bikes around Elk Meadow in the days when large meadows still existed there. Summers were spent creating bike parks with friends along the canal in southwest Bend.

Growing up in Bend gave him unique perspectives and experiences that sent him on a twisted career trajectory that mixed education, travel

and work.

"Though I had a late start as an engineer, I wouldn't trade it for any of the experiences I had along the way," he said.

Those experiences included math and science classes at Central Oregon Community College, liberal arts classes at Portland Community College and then a degree in philosophy from Portland State University.

"I felt that it was important to have a well-rounded education, or maybe that was just my way of rationalizing the difficulty of picking a career path," said Young.

Degree in hand, Young decided to go to the birthplace of philosophy and spent four months cycling around Greece and Turkey, exploring ancient ruins and camping along the Mediterranean Sea. Then there was a stint in New York City working at a design studio.

"In New York, I realized that I wanted to do something bigger and more challenging," said Young. "So at 25 years old I decided to go back to school and become an engineer."

His interest in engineering actually started a few years earlier. While working at a coffee shop in Portland, he struck up conversations with a frequent customer, William Winters, a self-em-

ployed mechanical engineer.

Winters introduced concepts of engineering, and those conversations planted a seed in Young to pursue the field as a career.

"We would stay late talking theoretical physics, philosophy, religion, politics, etc. And through those conversations, I was inspired by his knowledge and intuition," said Young. "He never explicitly suggested that engineering was the best route for me, but through him, I realized that it was a powerful discipline that would ultimately give me the breadth of scientific and technical knowledge that I was looking for."

Young studied engineering back at Portland State, found his way to the labs of NASA and his eventual path to designing his bike tire. He even managed to wedge in work with Voltaic Systems, a solar panel company.

Young isn't quite sure what's next but hopes it will be something that can benefit humanity. Making a tire that gets more people out on their bikes is a start, he said. Or it could expand into designing tires that improve fuel efficiency, a step toward reducing carbon emissions.

"That is where I want to end up, doing something for the planet, for mankind," said Young. "That is how I think about things now."

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Yesterday's Cryptoquip: KIND OF CHEESE THAT FLATTENED TROPICAL FISH MIGHT ESPECIALLY ENJOY EATING: MANTA-RAY JACK.
Today's Cryptoquip Clue: N equals K

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Q X Y R B M X Q Q N D N G W D G P B R B
B X O R X V V R F R E M B ? Y G E U R Y
M J N E U B J G F R J G A A R E R V .
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