



Finding inspiration in the strangest places

When you think of animals that have the best cushioning for falls, chances are the hedgehog is not your first thought. The animal known for being covered in sharp, spiny quills couldn't survive a fall from any great distance, you might think.

However, the opposite is true. When hedgehogs, who are great tree climbers, fall, they curl into a ball and use their spines, better known as quills, as a shock absorber. Two students in the University of Akron's biomimicry fellowship program wanted to model shock-absorbing technology of an animal. After looking at many natural models including big-horned sheep and woodpeckers, they found their perfect candidate in the tiny mammal.

"Upon high-speed impact with the ground, the curled-up hedgehog walks away uninjured because the spines on their backs elastically absorb the shock," said **Nathan Swift**, a 2016 physics entrepreneurship graduate from the Science and Technology Entrepreneurship Program. He along with three other students from Case joined Hedgemon when it was founded in early 2015.

As part of STEP, each student writes their thesis on work done at a company for their entire second year. Most students intern at local businesses; Swift worked at Hedgemon as their Chief Operating Officer. "I made my company my thesis," Swift explained, adapting grant applications the company had already published and incorporating them into his paper. As a student

entrepreneur, Swift received help from his graduate adviser, Ed Caner, who helped guide the company by discussing priorities, strategizing business funds and suggesting directions for growth.

The main focus for Hedgemon is on designing a sports helmet liner to better reduce, or even eliminate, incidents of concussions. The design, of course, is based on the spines of a hedgehog. Right now Swift says Hedgemon is in "full-on prototyping mode," after collecting data on various samples.



He said, "We are trying to optimize design and continue collecting data that proves our technology is superior to what is out there right now."

In six to nine months, Swift expects the company to have produced a full-scale model that can be implemented in helmets. It is important for Hedgemon to achieve that step because, according to Swift, helmet manufacturers will only notice the product if they have comparable data to other helmet liners. And the only way to get that data is to build a complete model.

The company is also applying for grants with the National Science Foundation and publishing papers on the technology. They continue to raise money, as well as conduct testing in Akron.

In the future, Hedgemon is looking beyond football helmet lining. Though the team has not picked its next focus yet for the technology, Swift listed many applications, including packaging, flooring and use in seats or cars.

So if, at some point in the future, you see what looks like hedgehog spines in your next Amazon box, do not be alarmed. That packaging will better protect your order.

-- Edward Kerekes 