

Researcher's lens turns any smartphone into a portable microscope

April 16 2014, by Michelle Ma



A magnified image is displayed on an iPad screen. Credit: Thomas Larson

(Phys.org) —Imagine yourself examining species of coral in Fiji. Looking at fungi and parasites in grass seeds. Following ants across the ground up close, or picking out the striations in a piece of roast beef on rye.

People around the world are doing all this and more with a tiny, durable magnification [lens](#) built by an enterprising University of Washington undergraduate student.

The Micro Phone Lens, developed by UW mechanical engineering alumnus Thomas Larson ('13), can turn any smartphone or tablet computer into a hand-held [microscope](#). The soft, pliable lens sticks to a device's camera without any adhesive or glue and makes it possible to see things magnified dozens of times on the screen.

"A microscope is a tool you can do thousands of different things with and by making it cheaper, portable and able to take pictures, you open so many different possibilities that weren't available before," Larson said.

Larson completed his undergraduate degree in 2013 and formed his own company based in Olympia, Wash. After the initial success this winter of his first model that magnifies by 15 times, he is creating a new lens that will magnify up to 150 times. (Standard laboratory microscopes usually magnify between 50 and 400 times.)

The lens is about the size of a button and comes in its own carrying case. Users stick it flat onto a smartphone camera lens, turn on an external light source such as a lamp, then run the device in camera mode. Moving the device closer or farther from the object brings it into focus.

Several other products exist that can adapt a smartphone to be used as a microscope, but they are significantly more expensive, and the attachments are heavy or require permanent adhesives.

Larson developed his smartphone lens while working in the lab of Nathan Sniadecki, a UW associate professor of [mechanical engineering](#). The lab needed a miniaturized lens that could work with a cellphone as a microscope, and Larson took on the project. The lens he developed is now as powerful as the research microscopes used in the lab, Sniadecki said.

Larson decided to commercialize his product and participated in the

2013 UW Business Plan Competition, where his team placed in the top 16. Funding trickled in through various awards and scholarships that helped with early prototypes and advertising materials, but the project's potential was still iffy.

"Thomas did something that was truly unique—he dove right into the technology and the entrepreneurship," Sniadecki said. "Most mechanical engineers have jobs lined up after graduation, but Thomas chose to forego the 'safe' path and plunged himself into risky water."

After graduating last summer, Larson ran a Kickstarter campaign for the 15X microscope lens, and more than 5,000 people signed up. For the new graduate who was still looking for a job and living with his parents in Olympia, this was a sure sign of success.



The lens sticks to a device's camera without any adhesive and can turn any smartphone or tablet computer into a hand-held microscope. Credit: Thomas Larson

"It all just happened," he said. "Working at the UW helped me figure out the technical and business problems, but the Kickstarter proved this technology is something people wanted."

Larson shipped orders to people around the world who needed a microscope they could use in the field or in classrooms where expensive microscopes are in short supply. Now, he is creating the 150X lens, which will be available this summer. He manufactures the lenses at his lab space in Olympia and is working with an optical mold-making company to design more sophisticated optics for this new model.

Larson said he hopes the new design will be useful in disease diagnosis overseas, and in the increasing number of classrooms where iPads are the norm but microscopes still come at a premium. He is working with a global health physician to try to test the microscope at a clinic in Kenya, and he's getting feedback from teachers on what they need for their students.

"I'm hoping this microscope can make a difference," Larson said. "If I can just make it available, the right people and experts in the field can see its usefulness and take it from there."

Provided by University of Washington

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