Makers @ HS/HSL: An Ophthalmic Imaging Entrepreneur
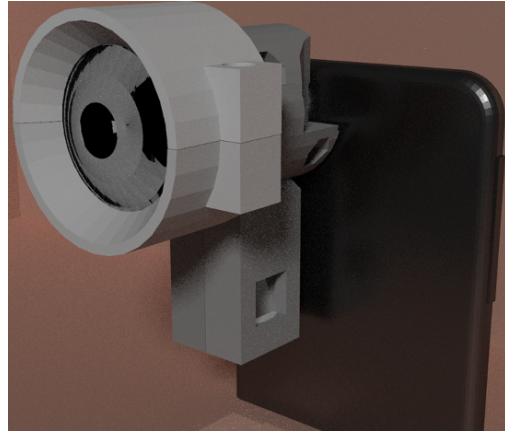
Users:	Sachin Kalarn
Affiliation:	Department of Ophthalmology and Visual Sciences, University of Maryland, Baltimore School of Medicine
Project:	Design prototyping, and 3D printer repair
Used:	Blender, RepRap Mendel, Lulzbot Taz5

Sachin Kalarn, M.D., is a first-year Ophthalmology resident. He's also a social entrepreneur building a startup around a smart phone retinal imager using a modular adapter he invented. The small device is intended to bring ophthalmic imaging to under-served communities to detect individuals who risk preventable blindness from diseases like glaucoma and diabetes.

The World Health Organization estimates that 80% of all visual impairment can be prevented or cured. According to Dr. Kalarn, diabetic retinopathy and glaucoma together account for nearly 10% of such cases. The prevention method for these two diseases is well known - screen individuals by taking high quality images of the back of the eye before the disease develops. Dr. Kalarn worked to set up a vision screening clinic in an under-served South Tuscon neighborhood with residents at-risk of developing diabetic retinopathy and glaucoma. He found that equipment cost, transportation logistics, and the

So Dr. Kalarn designed and 3D printed a lens system that can be attached on any smartphone with a five megapixel or greater camera. "The goal with my device is to make it as simple as possible to get good images of the back of the eye, from within the very communities where people need it most."

A 3D model rendering of Kalarn's invention

Over the past year Dr. Kalarn has sought support to get his product to market, including KeyTech, a Baltimore product design firm, and Sling Health St. Louis, an incubator for medical technology startups. He also made it to the semi-finals of the 2016 Global Health and Innovation Conference (see his first and second video pitch for funding on YouTube).

Dr. Sachin Kalarn, M.D.

Dr. Kalarn earned his M.D. from the University of Arizona College of Medicine. He's been a curious tinkerer since childhood, and learned about 3D printing and modeling from a medical school colleague. He's become an expert with Blender, a free and open source animation and modeling software, and built his own RepRap Mendel 3D printer from scratch. When a part on his Mendel printer broke, he used the HS/HSL Innovation Space to print a new part.

Dr. Kalarn is always interested in teaching people about entrepreneurship and the potential of 3D printing. Contact him via email if interested.

Emerging Tech in the News and Literature

1. The Surgeon Giving His Patients VR Instead of Sedatives (bbc.com)

2. A Modular Approach to the Design, Fabrication, and Characterization of Muscle-Powered Biological Machines (nature.com)

[Bioprinting in Medicine](#) (nih.gov)

Did You Know?

The HS/HSL Innovation Space has a Mac Pro with multimedia software like [Adobe Creative Cloud](#), and medical imaging tools such as [Osirix](#). Read our [multimedia Mac guide](#) for more details.

Upcoming HS/HSL Innovation Space Workshops

Introduction to 3D Printing

- March 10, 2017
- March 14, 2017
- March 28, 2017

Introduction to 3D Modeling

- March 1, 2017
- March 17, 2017
- March 31, 2017

Register for our free workshops

New to the HS/HSL Innovation Space?

The Innovation Space is designed for innovative and collaborative hands-on learning experiences. It offers three [3D printers](#), two [3D scanners](#), a [Mac Pro](#) with specialized multimedia software, over 3,500 video tutorials from [Lynda.com](#) (available on-site only), a plotter for [poster printing](#), [Google Cardboard](#) viewers, a large DNA model, two molecule kits, a button maker, and a 3D printing pen. The staff provides orientations as well as workshops on a regular basis for those who are new to 3D printing and 3D scanning.

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