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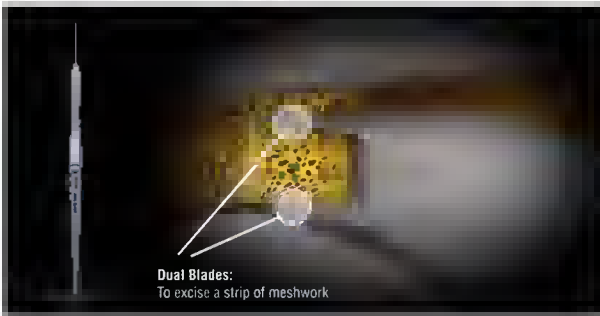
UCHealth Eye Center lands global innovation awards

For the world's most innovative eye center, look no further than the University of Colorado

By: Todd Neff, for UCHealth | January 6th, 2016

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*w*The *Ophthalmologist* Magazine's **2015 Innovation Awards** were a global affair. The year's top 10 technologies included one each from Switzerland, Japan and South Africa; three from Germany; and four from the United States, including devices developed in Middleton, Wisc., and Orlando, Fla. The other two American inventions – including the innovation that took the top spot in the rankings – emerged from the same building on the Anschutz Medical Campus.



The *Harmoni Modular IOL* (intraocular lens), in clinical trials outside of the United States, shows great promise for patients with cataracts. It consists of a base platform and a separate replaceable optic. Both pieces are inserted through a 2.2 millimeter incision. Courtesy *ClarVista Medical, Inc.*

That building is the UCHealth Eye Center. The technologies cited included the top-ranked *Harmoni Modular IOL*, an intraocular lens to treat **cataracts**; and the *Kahook Dual Blade*, whose fine-tuned slicing relieves pressure in the eyes caused by **glaucoma**.

The *Kahook Dual Blade*, which came in at number 7 in *The Ophthalmologist's* rankings, borrows its name from its inventor, Malik Y. Kahook, MD, professor of Ophthalmology and vice chair of clinical and translational research at the University of Colorado School of Medicine. The *Dual Blade* provides a straightforward, inexpensive way to treat a disease that afflicts an **estimated** 3 million people in the United States and 60

million people worldwide, according to the Glaucoma Research Foundation . The World Health Organization has pegged glaucoma as the second-leading cause of blindness.

There are two main ways to treat the high intraocular fluid pressure that is glaucoma's hallmark



specifically, something called the trabecular meshwork. Through a corneal incision of just 1.2 millimeters, the stainless-steel blade can neatly excise strips of the mesh to let the fluid flow again (this animation shows the Dual Blade in action).

“There’s no need for electricity and no moving parts,” Kahook said. “That makes it cost-effective in a way that gives it global reach. Most countries in the world can’t afford the expensive devices we have here.”

Kahook says he started working on the blade three-and-a-half years ago; New World Medical, Inc., which specializes in glaucoma drainage technologies, licensed the Dual Blade and has led it to market. In addition to being available in the United States, the device is approved in several countries, Kahook says, including Canada, which approved it on Dec. 22. Kahook expects the Dual Blade to be approved in Europe in early 2016.

CU Ophthalmologist **Leonard Seibold, MD**, an Eye Center glaucoma specialist, says he has used the Kahook Dual Blade on mild, moderate and severe cases, and has paired it with cataract surgery with success. The device “carries more risk than our in-office laser treatments that are non-incisional,” he said, but “has allowed for faster recovery and less risk of vision-threatening complications” than traditional glaucoma surgeries.

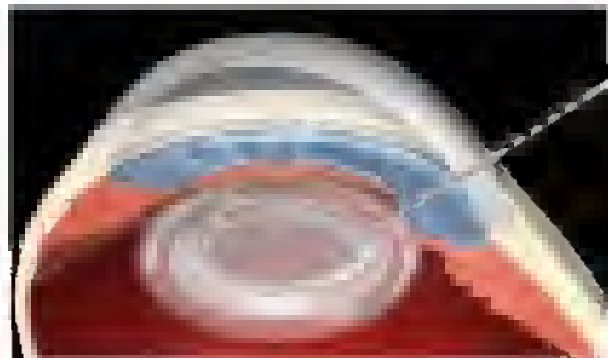
“I really like the simple, yet elegant design of the device,” Seibold said. “Many devices have been used to accomplish this over the years, but none have achieved it in a manner so simple yet so complete.”

The Ophthalmologist’s judges agreed, saying the device will enhance patient safety, lower costs, and enable procedures in underserved areas.

Harmoni tops list



Kahook was also co-inventor of the Harmoni Modular IOL, which he developed with colleague Naresh Mandava, MD, chairman of the CU School of Medicine’s Department of Ophthalmology. The target here is cataracts, a clouding of the eye’s lens. **According to** the National Eye Institute, cataracts are among the leading causes of vision loss and blindness, afflicting an estimated 25 million people in the United States and more than 150 million people worldwide. By age 80, half of Americans either have a cataract or have had cataract surgery, the institute says.



The Kahook Dual Blade, whose micro-machined blade can precisely remove trabecular meshwork in the eye, allowing fluid to escape the eye of a glaucoma patient. Courtesy New World Medical, Inc.

Malik Kahook, MD.

Cataract surgery involves replacing the clouded lens with an artificial one that's anchored in something called the intraocular capsular bag. With traditional intraocular lens replacement, once the new lens is in, it's usually in for good, Kahook says.

"Removing a traditional lens is a problem because it can tear the capsular bag and can cause great harm to vision," he said.

Yet often, patients would benefit from a replacement lens. Cataract surgery is happening earlier and earlier, and replacement lenses could help the eyes adjust to changes that occur over time. In pediatric cases, the ability to exchange lenses would change the game, Kahook says. Also, new lenses could help patients cope with the progression of eye disease, such as glaucoma and macular degeneration, that emerge after cataract surgery, Kahook says. And then there's the march of progress.

"Technology changes," says Kahook, "So there may be a new lens technology that comes along in 10 years, and if you already have a lens, you're out of luck."

With Harmoni the base platform is anchored in the capsular bag like a traditional lens. But the optic portion, which focuses light to produce crisp vision, can be replaced as a patient's needs – or the technological state-of-the-art – changes. The decoupling also lets ophthalmologists rotate the lens as needed, which could enable corrections for problems like astigmatism. (Check out [this animation](#) of the frame and lens being inserted through a 2.2-millimeter incision and unfurling like butterflies from their cocoons).

Game changer

The Harmoni lens, licensed to ClarVista Medical, Inc., remains experimental in the United States, but since late 2013 it has shown excellent results in overseas trials, Kahook says. It received its CE mark in Europe in September; the company is hoping to hit the U.S. market in 2019, he says.

The judges considered Harmoni to be revolutionary; [Richard Davidson, MD](#), a CU Ophthalmology professor and specialist in cataract, cornea, and refractive surgery, agreed. He says he's looking forward to the device being approved.

"I think it's really going to change how we look at cataract surgery," he said.

He added that innovations of the sort happening at the UCHealth Eye Center have a wider impact on the institution.

"The fact that we're in this environment and have built this culture where translational research really works adds to the collegiality and camaraderie of what we do here." Davidson said.



Naresh Mandava, MD.

Kahook says the lens could help with more than cataracts.

“Once you’ve uncoupled the optic from the base platform, you’ve opened the intraocular lens to a whole new world of innovation,” he said.

Kahook intends to help open up that world and others. He says he, Mandava, and their colleagues are always coming up with ideas – though 99 percent of the time, someone’s already working on it.

“But every now and then, we think of something and we look at each other and ask, ‘Why didn’t anybody think of this before?’”

At that point, inspiration cedes to perspiration and the experience necessary to make viable products happen, he says. They quickly kill flawed ideas; they partner on campus and off to move promising ones out of the lab quickly.

“We do a really good job of figuring out what’s going to work or not,” Kahook said.

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Since 2008, Todd Neff has written hundreds of stories for University of Colorado Hospital and UCHealth. He covered science and the environment for the Daily Camera in Boulder, Colorado, and has taught narrative nonfiction at the University of Colorado. He was a 2007-2008 Ted Scripps Fellowship recipient in Environmental Journalism at CU.

His latest book, "The Laser That's Changing the World," tells the story of the inventors and innovators who saw, and ultimately realized, the potential of lidar to help solve problems ranging from smogstack