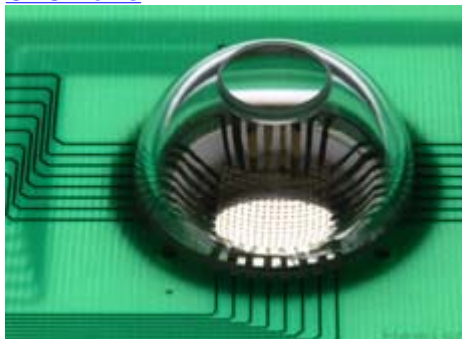


# Scientists mimic eye with curved electronic camera

*Last Updated: Wednesday, August 6, 2008 | 1:06 PM ET* [Comments 14](#) [Recommend 23](#)  
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*View of completed electronic eye camera, mounted on printed circuit board (green) for convenient connection to a computer. The camera is approximately the size and shape of a human eye. (Beckman Institute-University of Illinois)*

Scientists say the design of an electronic camera that mimics the shape of the human eye allows for improved imaging and could lead to new developments in bionic implants and sensors.

Researchers at the University of Illinois at Urbana-Champaign and Evanston, Ill.-based Northwestern University described a method of using flexible electronics to attach a flat sensor to a curved shape similar to the surface at the back of the human eye.

The researchers were able to create a working camera using their methods, and will publish their findings in the Aug. 7 issue of the journal *Nature*.

Scientists have known this curvature allows for a wider field of view and sharper images to be processed in a small space. But digital and video cameras have traditionally relied on flat image-recording surfaces because the semiconductor material like silicon that electronic circuits rest on can't be compressed or expanded more than one per cent without breaking.

Camera makers get around this by using multiple lens arrangements to counteract the distortion that normally occurs at the edges of such flat lenses. But multiple-lens arrangements are bulkier and impractical for smaller applications.

The Illinois researchers got around this problem by building an array of photo sensors connected by small wires. Each photo sensor, or pixel, was quite small, with a total area of about 0.56 millimetres by 0.56 millimetres, while the wires themselves were about 0.36 millimetres long.

While the wires bend and flex as the circuit is transferred to a curved surface, the sensors themselves receive less strain. The sensor array is also sandwiched between two other layers, which also act to absorb some of the stress while helping the circuit retain its shape.

Though the 16-by-16 array the researchers built is relatively simple and impractical for all but the most basic imaging, the researchers said they hope to test the methods on even larger arrays.

John Rogers, a materials science and engineering professor at the University of Illinois at Urbana-Champaign and one of the authors of the study, said the results could have far-reaching impacts on

optical devices beyond just cameras.

"We believe that some of the most compelling areas of future application involve the intimate, conformal integration of electronics with the human body, in ways that are inconceivable using established technologies," he said in a statement.

"We are working actively with collaborators to explore possibilities in advanced health monitors, prosthetic devices and therapeutic systems."

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**GaryDale wrote:**Posted 2008/08/11

at 4:43 PM ETAnother potential use is as a retina replacement. Similar devices have already been tried experimentally to allow people to see basic shapes. The problem is getting enough pixels to give a high resolution image. In these roles, you don't want to change the lens or other eye parts - just the defective retina.

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**Gallifrey wrote:**Posted 2008/08/07

at 12:17 AM ET@Prime Numbers -

"The human eye works, but is certainly not optimal."

You're right, it's not optimal. It's optical. Har.

In seriousness, it's an amazing bit of technology. The applications are fantastic to think about, from robotics (the military could get a lot of use out of this sort of optical system on drones, and search and rescue robots would have much greater fields of vision) to cybernetics. We're reaching the stage of having actual working mechanical-neural interfaces, so eye replacements have just become a bit more of a future reality.

Simple security and observation tech is likely to gain from this as well.

Neat stuff.

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**pinocchio wrote:**Posted 2008/08/07

at 2:50 AM ETMy apologies, I wasn't trying to stir up a creationism / evolution debate. Just trying to highlight how amazing is this work on vision technology.

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**Silly RPM wrote:**Posted 2008/08/07

at 1:36 AM ETHow long 'til those eyes are better than our God-given ones? 'cause no offense to God, but I want some. In the back of my head.

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**PrimeNumbers wrote:**Posted 2008/08/06

at 7:51 PM ETIf creationism were true, the human eye would not have a blind spot and I'd not need to wear spectacles.

Evolution has been seen, and it works, although doesn't seem to produce totally optimal results. The

human eye works, but is certainly not optimal. If it were intelligently designed, it would not be inside-out for starters.

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