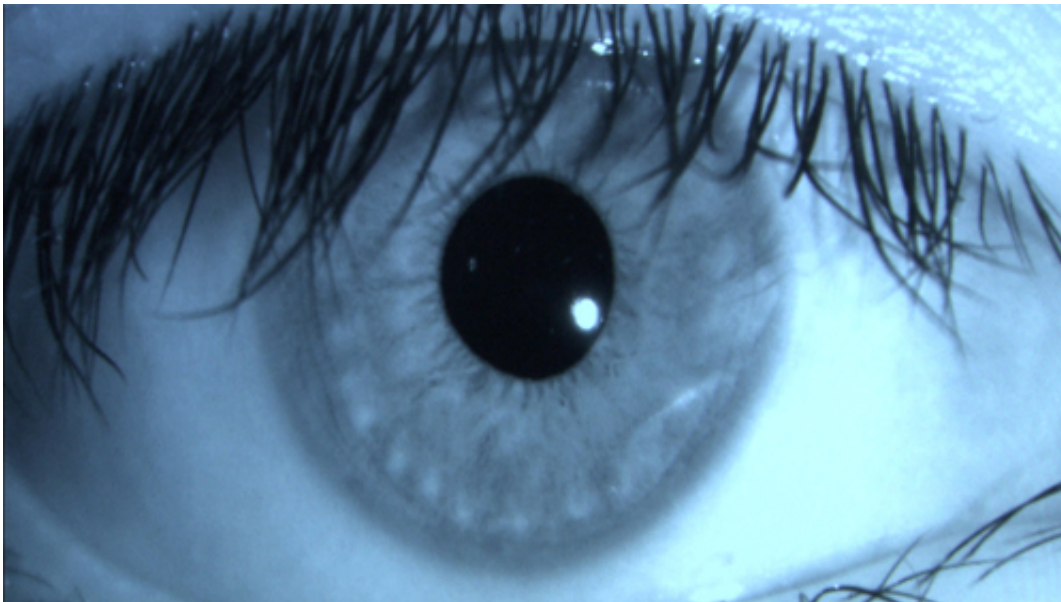# Computer scientist sees new possibilities for ocular biometrics

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Traditionally, a person might enter a password or pull out a driver's license or passport as proof of identity. But increasingly, identification and authentication can also require an eye scan or a well-placed hand. It's a science known as biometrics, recognizing individuals based on their physical or behavioral characteristics. The structure of the face, the geometrics of the hand, the ridges of a fingerprint, the patterns in an iris--every person carries multiple human traits that are a unique form of personal identification. "The primary advantage of a biometric trait is that it belongs to that individual. You're implicitly connected to it, unlike passwords or tokens or passports, which are external to an individual," says Arun Ross, a computer science and electrical engineering professor at West Virginia University, one of three institutions where the National Science Foundation is helping to fund a coalition of biometrics research sites. The Center for Identification Technology Research, or CITeR, as the coalition is known, is an example of the important role that public and private

funding can play in the innovation process. Credit: NBC Learn, U.S. Patent and Trademark Office, and National Science Foundation

While many of us rely on passwords to protect our identity, there's more sophisticated identity recognition technology called biometrics that we could use. Security measures that use biometrics rely on a person's unique characteristics and traits rather than on what that person can remember, such as a password. Ocular biometrics, in particular, relies on iris and retinal scanning.

With support from the National Science Foundation (NSF), computer scientist Oleg Komogortsev and a team at Texas State University are taking the technology a step further, making it even more secure, reliable and nearly impossible to fool.

They are developing a three-layered, multi-biometric approach that tracks the movement of the eye globe and its muscles, and monitors how and where a person's brain focuses visual attention, in addition to scanning patterns in the iris. The iris is the colored part of the eye.

The team's system essentially upgrades the security of existing iris recognition technology with nothing more than a software upgrade, and the benefits extend well beyond security. This technology can detect not only the identity of the person, but the state of the person, including the individual's level of fatigue or stress. Komogortsev says it could even be used inside the helmets of football players to detect concussions.

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