

## Smart Contact Lenses for Home-Based Monitoring of Intraocular Pressure

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**Categories:**

- Biomedical Engineering

**Keywords:**

- Biomedical Engineering
- Eye-wearable biosensors
- Glaucoma
- Smart contact lenses

Researchers at Purdue University have developed smart soft contact lenses that continuously monitor intraocular pressure (IOP) with improved diagnostic accuracy compared to the commercial standard. Glaucoma, which is caused by an increase in IOP, is the second-leading cause of blindness worldwide; it affects approximately 80 million people and causes a global economic burden of \$6 billion annually. The industry standard method for measuring IOP is Goldmann applanation tonometry, which requires clinic visits. The Purdue lenses monitor IOP in real-time and at-home. The lenses consist of a wireless tonometer integrated in commercial soft contact lenses and conform seamlessly to the human eye without restricting comfort level like other soft contact lenses. The tonometer is > 10 times softer and thinner than typical soft contact lenses.

**Technology Validation:** The lenses have sensitivity of over 0.000150 mmHg, which is larger than the sensitivity of other smart lenses. Also, the lenses have been rapidly prototyped; over 10 units are produced per print, potentially allowing high-throughput batch manufacturing.

**Advantages**

- home-based
- improved diagnostic accuracy
- excellent biocompatibility, allowing long-term wearability
- chemically stable
- unobtrusive

**Applications**

- monitoring of intraocular pressure for glaucoma patients and suspects
- potentially other applications such as controlled delivery of therapeutic ocular agents, surveillance of ocular injury, detection of eyeball movement, and monitoring of glucose levels

**People:**

- Lee, Chi Hwan (Project leader)
- Boudouris, Bryan William
- Irazoqui, Pedro P.
- Kim, Ho Joong
- Kim, Kyunghun

**Intellectual Property:**

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**Contact OTC:**

Purdue Office of Technology Commercialization  
The Convergence Center  
101 Foundry Drive, Suite 2500  
West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: [otcip@prf.org](mailto:otcip@prf.org)