

International Conference on **Eye Disorders and Treatment**

July 13-15, 2015 Baltimore, USA

An accommodative contact lens for Presbyopic correction

Hongrui Jiang
University of Wisconsin, USA

Presbyopia is the most common ocular affliction and presents an extraordinary public health issue. IN this talk I will discuss about a new strategy to correct presbyopia by developing a new type of contact lens called an accommodative contact lens (ACL) that incorporates a tunable liquid lens for accommodation and devices to convert light energy to electricity and store it in situ for the operation. I first demonstrate two types of flexible, variable-focus liquid microlenses: one driven by electrowetting and the other by dielectrophoretic force. Both types of liquid microlenses are fabricated onto soft polymers for ultimate integration and embedment into contact lenses. A tuning range of more than 10 mm in focal length and fast, sub-second tuning speed have been achieved for both types of lenses. I then discuss about light energy harvesting and storage devices that can potentially be integrated into contact lenses, including dye-sensitized solar cells (DSSCs) and micro-supercapacitors. We are especially interested in simultaneously achieving energy harvesting and storage within the same single device structure, so that it can provide steady photocurrent output under sunlight illumination, while part of the photo-generated electrical energy is stored. Lastly, I present a fabrication platform to integrate the accommodative liquid lens, control electronics, and energy harvesting and storage device into the soft contact lens for presbyopic correction.

Biography

Hongrui Jiang received his Ph.D. in electrical engineering from Cornell University in 2001. He was a Postdoctoral Researcher at the University of California-Berkeley, Berkeley, from 2001 to 2002. He is currently the Lynn H. Matthias Professor in Engineering and the Vilas Distinguished Achievement Professor at the University of Wisconsin – Madison. His research interests are in optical MEMS, bioMEMS, smart materials and micro-/nanostructures, lab on a chip, and biomimetics and bioinspiration. He received numerous awards, including the US National Institute of Health Director's New Innovator Award in 2011. He has more than 150 peer reviewed publications and seven issued patents.

hongrui@engr.wisc.edu

Notes: