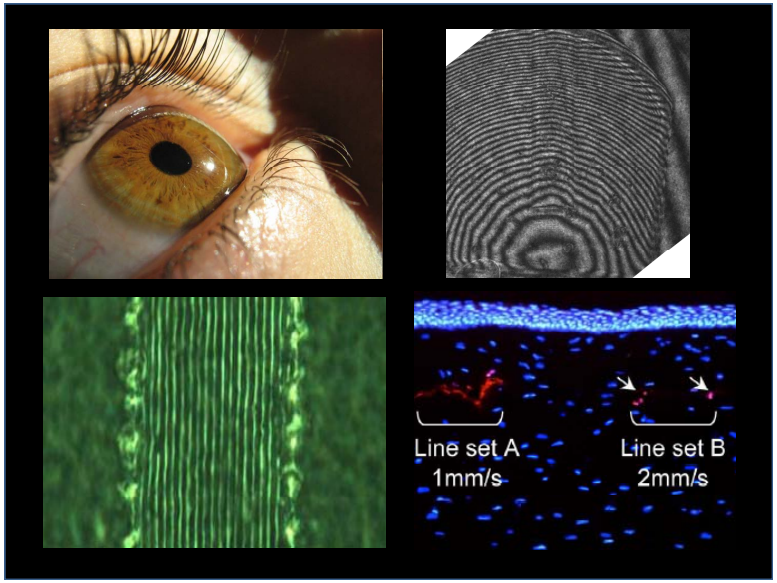
The Institute of OPTICS

Colloquium

UNIVERSITY OF ROCHESTER

Non-invasive vision correction using femtosecond lasers



Professor Wayne Knox
Institute of Optics and Department of Physics
University of Rochester
BS, PhD in Optics, Rochester
Bell Labs, 1994-2001

3:45 pm Wednesday, Feb 22, 2012
B&L 106
Tea, 3:30pm, B&L 271

We discuss recent experiments in which femtosecond lasers are used to induce 3D micromachined index of refraction differences in transparent hydrogel polymers or ocular tissues such as cornea or lens.

HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES

Joint Physics - Optics Colloquium

Non-invasive vision correction using femtosecond lasers

Dean Wayne H. Knox

University of Rochester

Abstract: We discuss recent experiments in which femtosecond lasers are used to induce 3D micromachined index of refraction differences in transparent hydrogel polymers or ocular tissues such as cornea or lens. We find that relatively large index of refraction changes can be made (up to +0.06) and demonstrate writing refractive correctors using a layered lateral gradient index methodology. For the case of hydrogels the induced effects are permanent (lasting >2.5 years). For the more complex case of living cornea tissue where we find that we can induce refractive index changes up to +0.037 without killing keratocytes, we don't know yet whether they will be permanent. We believe that this will lead to a new form of noninvasive vision correction.

Biography: Wayne H. Knox obtained BS (1979) and PhD degrees (1983) at The Institute of Optics, University of Rochester. He went to Bell Labs in Holmdel NJ in 1984 and worked as a Postdoctoral Fellow, was promoted to Member of Technical Staff in 1985 and to Distinguished Member of Technical Staff in 1990. In 1997, he was promoted to Director of the Advanced Photonics Research Department. He is a Fellow of the OSA and a Fellow and Life member of the APS. In 1990 he won the National Academy of Sciences W.O. Baker Award for Initiatives in Research. In 1999 he won the Richtmyer Award for Physics teaching from the AAPT. He has over 150 publications and has 50 or more patents granted or pending. He was Director of The Institute of Optics from 2001 to 2011 and is now Associate Dean of Education and New Initiatives in the Hajim School of Engineering and Applied Sciences.