

New trends in ocular research

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Abstract

The seminar will provide an overview of research studies of human eyeball biomechanics, which plays a critical role in a significant number of ophthalmic pathologies and their diagnosis. The mechanical parameters of the components of the human eyeball have a significant influence on the functioning of the optical system, and the relationship is so unambiguous that one can speak of a mechanical-optical coupling. This means that for purely optical reasons, the structural, geometric, and material parameters must meet certain strict conditions. Determining these conditions is the first step toward the modelling of the eyeball, and it enables simulating the physiological and diagnostic processes as well as predicting the effects of eye pathologies. The presentation will cover the biomechanical biomarkers in use in clinical diagnostics of eye diseases, including glaucoma and keratoconus.

About the lecturer

Magdalena Asejczyk received her Ph.D. degree in physics from Wrocław University of Science and Technology in 2004 and her D.Sc. degree in biophysics from Adam Mickiewicz University in Poznań in 2018. She is currently an Associate Professor at Wrocław University of Science and Technology, Department of Optics and Photonics, and Head of the Visual Optics Group there. The area of her professional and scientific activity is interdisciplinary; it concerns aspects such as: biomechanics of the eye, opto-biomechanical modelling of the eye, birefringent properties of the cornea, numerical simulations of diagnostic procedures, e.g. air-puff and dynamic tonometry, development of numerical methods to determine biomechanical biomarkers of the cornea for early diagnostics of ocular diseases. She publishes mainly in journals related to biomechanics, ophthalmology, and optics.