



DOCTORATS
INDUSTRIALS

EL PLA DE
DOCTORATS
INDUSTRIALS

PROJECTE DE DOCTORAT INDUSTRIAL EXPEDIENT 2014 DI 045

DADES DE L'EMPRESA I DE L'ENTORN ACADÈMIC

Títol del projecte

Novel system for measuring the intraocular scattering associated to the cornea and the lens

Empresa

VISIOMETRICS S.L.

Responsable de l'empresa

Juan Antonio Bonel Borssen

Universitat

Universitat Politècnica de Catalunya

Director/a de tesi

Meritxell Vilaseca Ricart

Treballador/a de l'empresa i doctorand/a

Pau Santos Vives

BREU DESCRIPCIÓ DEL PROJECTE DE RECERCA

Intraocular diffused light plays a very relevant role in vision, especially in eyes with corneal diseases, cataracts and bad tear film quality such as those undergoing refractive surgery. Therefore developing systems for its correct clinical assessment is of great importance. Procedures commonly employed by ophthalmologists involve the direct observation of the cornea and the crystalline lens through a slit lamp, although such procedures are linked to a high variability due to the fact that they are subjective. Other recent approaches include from psychophysical testing tools such as the instrument C-Quant (Oculus GmbH, Wetzlar-Dutenhofen, Germany) to more objective methods such as the instrument based on the double-pass technique HDA (Visiometrics S.L., Terrassa, Spain), which was developed by the CD6 in collaboration with the LOUM (Prof. Pablo Artal, University of Murcia). The HDA instrument computes an objective scatter index (OSI) from the retinal image of a point source object acquired by a digital camera. Results obtained so far suggest the usefulness of this parameter in evaluating diffused light inside the eye.

However, none of the former available systems allow separating the contribution of scattering from different parts of the anterior segment of the eye, i. e. the cornea and the lens, and this remains as an unresolved issue. The aim of this thesis is therefore to develop a tool for objective and independent measure of intraocular scattering produced by different parts of the eye. This will be very useful from a clinical point of view as ophthalmologist will have much more information available for diagnosis of ocular diseases.



Generalitat de Catalunya
Departament d'Economia i Coneixement
Secretaria d'Universitats i Recerca



Agència
de Gestió
d'Ajuts
Universitaris
i de Recerca



EL PLA DE DOCTORATS INDUSTRIALS

Different strategies will be used taking into account the measurement of the light reflected back by the different corneal surfaces as well as that reflected by the iris and the lens. The recording of the images will be made using a high sensitivity camera for reference on the light present in peripheral areas, which are the most influenced by intraocular scattering. New and robust parameters for the objective assessment of the scattering present at the cornea and the lens will be defined. The new setup will be validated by using artificial eyes and a small group of subjects with different corneal scattering, elucidating differences of intensity and spatial patterns linked to the different degrees of corneal scattering. Finally, the prototype will be validated in a clinical environment.

The thesis will be developed at the CD6-UPC and Visiometrics S.L.