To the honorable members of the Scientific Jury
Designated by Order No. РД-38-575/03.10.2022
of the Rector of Sofia University
"St Kliment Ohridski"

Prof. ANASTAS GERDJIKOV

Statement of Opinion

concerning

a PhD thesis in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.1. Physical sciences, Biophysics

Opinion prepared by: Assoc. prof. Lubomira Nikolaeva-Glomb, MD, PhD, Head of the department of Virology at the National Centre for Infectious and Parazitic Diseases, 44A Gen. Stoletov Blvd, 1233 Sofia, in her capacity as a member of the Scientific Jury designated by Order № РД-38-575/03.10.2021 of the Rector of Sofia University.

Topic of the PhD dissertation: "*In vitro* and *in vivo* Contact Lens Dewetting Investigations using *Placido* Ring based Videokeratoscopy "

Author of the PhD dissertation: Sebastian Marx, M.Sc. Optometry/Vision Science, Dipl.-Ing. (FH) AO, FIACLE

I hereby declare that I have no conflict of interest within the meaning of Art. 4, para. 5 of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB). I have no common publications with Sebastian Marx.

The materials submitted for the defense meet the requirements of the Law and the Regulations for its implementation.

I. General description of the submitted materials

1. The submitted documents

The candidate has presented a PhD thesis, its abstract, as well as a reference for the implementation of the mandatory additional requirements set by the Faculty of Physics from the Regulations on the terms and conditions for obtaining scientific degrees and holding academic positions at Sofia University "St. Kliment Ohridski". Curriculum vitae, master's and engeneer's diplomas, scientific publications and auxiliary tables are also presented. The submitted documents comply with the requirements of the national law and, the Regulations on the Terms and Conditions for Acquiring Scientific Degrees and Holding Academic Positions at Sofia University "St. Kliment Ohridski ", as well as the additionally

set higher requirements of the Faculty of Physics.

2. The candidate

Sebastian Marx graduated in 2000 from the OSZ Havelland School of Ophthalmic Optics in Rathenow, Germany and completed his master's degree in Optometry at the Ernst-Abbe-Hochschule Jena**,** University of Applied Sciences, Jena, Germany. As an employee of JenVis Research Institute, Jena, Germany he is coordinating research projects and is responsible for the clinical part of the projects. Parallel to his work, Mr. Sebastian Marx is a part time lecturer at the University of Applied Sciences in Jena in the field of vision research. He is also a member of the German Committee of Standardization. Since 2006 Mr. Sebastian Marx has been a member fellow of the International Association of Contact Lens Educators and holds the position of a teaching assistant at Ernst Abbe University, Jena, Germany. In 2010 Mr. Sebastian Marx along his research team was awarded the Peter-Abel-Award of the VDCO eV (Vereinigung Deutscher Contactlinsen-Spezialisten und Optometristen e.V.) for the development of new tear film assessment methods. In 2019 he was again awarded for investigating the impact of contact lens wear on Meibomian Gland Dysfunction with the CLASS study group.

3. The scientific achievements of the candidate

Sebastian Marx's scientific interests cover several different but related fields of modern vision science, as well as data acquisition (automatisation of the optometry measurement) and optical topography. The research in this area has led to 14 scientific publications in the recent 5 years, which are cited 41 times according to the Web of Science.

The PhD thesis is based on 5 scientific papers that have been published in the period between 2019 and 2022. The results have been presented as 2 oral and 2 poster conference papers. Three publications belong to group I (1 from Q1 and 2 from Q2 level), one publication – to group II (Q3 level) and one is published in a well-established international journal. Sebastian Marx has a significant contribution in all the 5 publications.

The candidate has indicated 9 more publications on the topic of the dissertation published in refereed journals, which, however, are not included in the PhD thesis.

The scientific publications, that serve as a base for the PhD thesis, overtop the minimum national requirements and the additional higher requirements set by the Faculty of Physics at Sofia University "Saint Kliment Ohridski" for obtaining the PhD degree. There is no legally proven plagiarism in the submitted dissertation and abstract.

4. The achievements

The topic of the PhD thesis has an emphasized applied preclinical character. The evaluation of the wettable contact lens surface is essential for the clinical application. Especially, the ability to observe in real-time regime the wetted status of the contact lens surface and its dependence on the environmental parameters (mechanical lid interactions, possible protein and/or lipids accumulation) remains a considerable technological challenge.

The primary objective of Mr. Sebastian Marx PhD thesis is to develop an objective diagnostic tool, based on the combination of the classical *Placido* ring videokeratoscopy and realization of target-oriented acquisition system with corresponding software development. The design of the pre-clinical study was prospective, randomized, open-label and had subsequently double-masked cross-over pilot character. The subjects were randomized to various daily disposable silicone hydrogel lenses contact lenses.

The first assessment (Study 1) in the PhD thesis was the application of *Placido* ring videokeratoscopy used as a subjective detection of the dewetting phenomena and fine changes in the tear film on the anterior surface of contact lenses. Ring projection, as assessed by video topography, was used for evaluation of the *in vivo* wettability of soft contact lenses.

The second objective, demonstrated in Study 2 was to compare the time necessary for reaching 15 % distorted area of the reflected *Placido* rings with various daily disposable contact lenses (e.g. Nelfilcon A (DACP, Alcon, USA) and Stenfilcon A (MyDay, Cooper Vision, USA), as well as to determine the dewetting rate at the time point of 15 seconds post blink.

The third objective of the thesis (Study 3) was to determine the *in vitro* dewetting characteristic curves of different daily disposable contact lenses that were measured out of their specific blister solutions using the *Placido* ring videokeratoscopy also described as non-invasive keratography-dry-up time procedure to determine the dewetting characteristics, as well to measure the *in vitro* dewetting characteristic curves of the same lenses soaked in saline solution (as a control solution) and an artificial tear solution in order to compare the dewetting characteristics.

5. Critical remarks and recommendations

The presented dissertation is in English comprising 137 pages. The abstract, with a length of 14 pages, has been translated into Bulgarian. 270 references are cited. Both the dissertation and the abstract are richly illustrated with figures. With the exception of some inaccuracies in the terminology in the Bulgarian text, I have no significant remarks. I am

aware of how difficult it is for an established scientist who communicates and publishes only in English or German to switch to Bulgarian, and therefore I tend to ignore minor inaccuracies.

6. Personal impressions

I know Mr. Sebastian Marx from the time when, I, as a teaching professor in the Master Program of Optometry, Department of Optics and Spectroscopy, Faculty of Physics, Sofia University listened to his research talk. He is an extremely active and creative researcher, completely dedicated to Optometry.

7. Conclusion

After getting acquainted with the presented PhD thesis, its abstract and the other additional materials, and based on the analysis of their significance and the scientific and applied contributions contained in them, **I confirm** that the scientific achievements meet the requirements of the Law and The Regulations for its application and the respective Regulations of Sofia University "Saint Kliment Ohridski", as well as the higher requirements of the Faculty of Physics for obtaining the scientific degree "Doctor". The candidate satisfies the minimum national requirements in the professional field and no plagiarism has been established in the dissertation, the abstract and the scientific papers submitted at the competition.

I give my **positive** assessment of the dissertation.

II. OVERALL CONCLUSION

I give my positive assessment and propose to the honorable Scientific Jury to award the educational and scientific degree "Doctor" to Sebastian Marx, M.Sc. Optometry/ Vision Science, Dipl.-Ing. (FH) AO, FIACLE in the professional field 4.1. Physical sciences. Biophysics.

Sofia, November 11th, 2022 Opinion prepared by: Lubomira Nikolaeva Krumova-Glomb

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