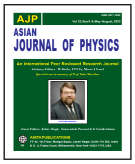

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What does optics teach us about myopia?

Brian Vohnsen

Advanced Optical Imaging Group, School of Physics, University College Dublin, Dublin 4, Ireland

Dedicated in memory of Prof John Sheridan

A proud County Mayo man, a passionate advocate of optics, and most of all a warm-hearted, caring and kind person with students, colleagues, family, and friends. Such was Prof. Seán (John) Sheridan, an amazing colleague and friend with whom I shared many memorable moments in University College Dublin (UCD) over the past 15 years. Although we were in different departments, he in Engineering and I in Physics, we were always closely connected in our research and teaching. He always went the extra mile to help students, take part in outreach, to meet up to discuss science and for a friendly chat and a healthy laugher. Eight years before me, in 2000, Seán had arrived to UCD from Dublin Institute of Technology (now Technological University Dublin), with a very strong optics background having worked with scientists such as Colin Sheppard and William Rhodes. Seán was keen on applying optics to real-world problems and with an entrepreneurial spirit he explored commercial opportunities. A decade ago, he became interested in the optics of the eye, and more particular the optics of the animal eye, when he got involved with horse breading and a spin-out company Equilume on the development of a blue-light mask that alters the breeding season for horses. He also co-developed a highly sensitive device to measure ocular movement as indicator of brainstem activity. He was familiar with my own work on vision and photoreceptors, and some of our last communications were on the topic of myopia. We had agreed to meet up with the CTO of Equilume, Dr Barbara Murphy, to discuss related matters in November 2022. This was just after I had returned from a conference trip to Recife, Brazil, and he had recovered from a recent and successful eye-squint surgery. Seán also had high myopia and aimed for cataract surgery by the end of the year with the hope of improving his eyesight. Sadly, just one-week later Seán passed away unexpectedly before we got the chance to meet again. In this contribution, I will review some of my optics background, and activities, that I shared with Seán, and discuss in some depth what optics may teach us about myopia.

Keywords: Holography, Fourier optics, Sensing, Myopia, Photoreceptors, Vision, Optica, SPIE

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1 Introduction

I first met Prof Seán (John) Sheridan in 2006 when he was an invited speaker at the Reunión Nacional de Óptica in Alicante, Spain, a meeting that was organized by Prof Inmaculada Pascual Villalobos (one of the Editors of this special issue of the Asian Journal of Physics) and colleagues. At that time, I was Ramón y Cajal researcher in Murcia, Spain, in the group of Prof Pablo Artal. Little did I know that less than 2 years later, Seán and I would become colleagues at University College Dublin when I was appointed Science Foundation Ireland Stokes lecturer in 2008. In my studies at Aalborg University, Denmark, I had been attracted to optics early on and completed M Sc in Optical Engineering in 1994. Much like Seán, I was fascinated by holography and had done a semester project on off-axis Leith-Upatnieks holograms with reconstruction of both the virtual and real images. This was followed by my thesis on computer-generated holography, under the guidance of Jens Christian Christensen, creating masks transferred with UV lithography to photoresist, to fabricate kinoforms that could transform an annular mode Nd:YAG laser beam into a top-hat profile by

Corresponding author

e mail: brian.vohnsen@ucd.ie (Brian Vohnsen)

means of Gerchberg–Saxton optimization. Afterwards, I was offered an exciting Ph D opportunity under the guidance of Prof Sergey Bozhevolnyi on Phase conjugation of optical near-fields and evanescent-wave holography with four-wave mixing using a photorefractive Fe:$LiNbO_3$ crystal [1,2]. This was exciting times for me with many new opportunities. Yet, 4 years after the Ph D, in 2001, I chose to leave my position as Assistant Professor to try new adventures when accepting a Marie-Curie postdoctoral opportunity in Murcia to learn about visual and adaptive optics. While there, it was a natural step to start lecturing holography and doing practicals with students on computer-generated Fourier holography, transmission and reflection holograms, topics that even impact on my lecturers today in Nano-Optics and Bio-Photonics.

Shortly after my arrival to Ireland, Seán and I, along with colleagues Prof Chris Dainty from NUI Galway, Dr Brian Hennelly and Dr Thomas Naughton both in NUI Maynooth, organized a series of "Optoinformatics" summer workshops on the NUI Maynooth campus. These exposed our students to invited expert lecturers and filled a gap between the larger bi-annular Photonics Ireland conference. Seán was mostly involved in the first of these due to health issues. Nevertheless, he never missed the opportunity to brighten my day such as when he called me "Gaucho Vohnsen" in his 2011 Christmas Greeting once he learned that I was visiting my wife's family in Argentina. Again in 2022/23 I visited the family in Villa de Mayo which, as pointed out by Seán's wife Jutta, would have delighted Seán with an Argentinian "Mayo". In November 2022, I visited Seán's home turf Castlebar in West Ireland (see Fig 1) for the first time to receive an Athena-Swan award, on behalf of the UCD School of Physics, an event that I would have loved to be able to share with you Chief.

Fig 1. A visit to Castlebar, Seán´s hometown, in County Mayo and the Atlantic Technological University on November 8th 2022 where I received the Athena-Swan gender-equality award on behalf of UCD Physics.

Outreach and education of the younger generation was always very central to Seán, as it is to me. Seán took on a lead role with a special 2015 event, the UNESCO International Year of Light, where he cast light onto the Dublin Spire in the middle of O'Connell Street. He had been central for the early establishment of the SPIE and OSA (now Optica) Student Chapters in UCD. In 2018, I took on the role as lead advisor for the Optica Student Chapter, whereas he continued as advisor for the SPIE Student Chapter, a role now passed on to his former student Dr John Healy. We maintain close contact between the optics students in

UCD Engineering and Physics through the Student Chapters with events such as “An Optics Afternoon” as seen in Fig 2. Our Student Chapter worked hard to organize IONS Ireland 2021 alongside the Tyndall & University College Cork Optica Chapter. We have been very popular at the annual UCD Summer Festival with interactive optics demonstrations about the eye and vision as well as optical illusions. Seán acted as intern examiner for a couple of my Ph D students, and I recently assisted as intern examiner for his last graduate student Dr Min Wan. At present, I am supervising two bright Optical Engineering students, Ms Shalini Pillay and Mr Piotr Zielinski, that started the Optical Engineering M Sc programme with Seán in September 2022 and are now completing their studies with me as principal supervisor on exciting projects related to visual optics and fringe-projection profilometry, respectively.

Fig 2. Our first “Optics Afternoon” on June 12th 2019 with speakers and guests in front of the Molloy Collection in UCD Physics. Prof Seán (John) Sheridan is third from the left next is Prof Vasudevan Lakshminarayanan (University of Waterloo), and behind them Dr Alexander Goncharov (NUI Galway). Our former students Dr Alessandra Carmichael-Martins 2022 Optica Ambassador (now Bloomington University), Dr Salihah Qaysi (now Jazan University), Dr Min Wan, and Dr Najnin Sharmin (now Intel) hold onto the banner with 2019 Optica Ambassador Maria Viñas Peña (CSIC, Madrid) between them. Third from the right is Prof Ian Flitcroft along with TU Dublin colleagues Dr Dervil Cody, Dr Kevin Murphy, and Dr Mark Coughlan. The following “Optics Afternoon” took place online during the Covid-19 pandemic on December 10th 2021.

In this contribution, I will discuss the topic of myopia and how it may relate to fundamental optical principles. Myopia is a topic that was not only of great personal interest to Seán but also of high global importance as we are witnessing increased prevalence of the condition with potential impact on not only people’s life’s but also on society at large due to increased ocular complications and health costs [3,4].

2 What is myopia?

Myopia has been known for centuries [5]. It is seen as excessive optical power of the eye that brings imaging light to a focus in front of the retina. Thus, a myopic person with –3 diopters has a preferred uncorrected viewing distance of 33 cm, with –6 diopters this is just 17 cm, and so forth. For the most, it can easily be corrected optically with negative spectacle lenses, contact lenses, or refractive surgery. Yet, with high myopia beyond –6 dioptres the risk of retinal detachment and other ocular complications increase significantly. This is the prime reason why major efforts are currently underway to limit its onset and slow its progression. Infants are born hyperopic but normal eye growth, the emmetropization process, happens at a pace so that in the ideal case children become emmetropic within the first few years of life as shown schematically in Fig 3. The onset of myopia happens mostly in the school years, at approximately 10 years of age, where an excessive axial lengthening of the eye by just 1 mm results in approximately –3 diopters [6]. Thus, light is gradually focused in front of the retina favouring near work but blurring far vision. Myopes develop axial lengths beyond the desired emmetropic 23 to 24 mm axial length. While this happens, both rod and cone photoreceptors changes and the foveal pit formation completes [7]. In the myopic eye photoreceptors adapt to the changes in axial length and remain approximately pointed towards the middle of the pupil [8,9].

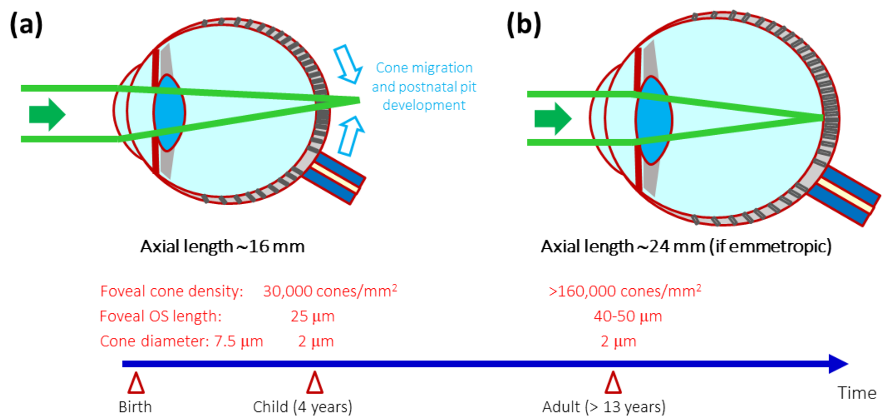

Fig 3. Schematic of temporal changes to the human eye from (a) birth towards the (b) ideal case of an emmetropic adult. The eye grows and elongates, while the retina continues to develop with higher density of longer and denser foveal cones and outer segments (OS). Likewise, in the peripheral and retina, cones and rods undergo density and shape changes from early childhood into the school years while axial elongation slows down in late adolescence.

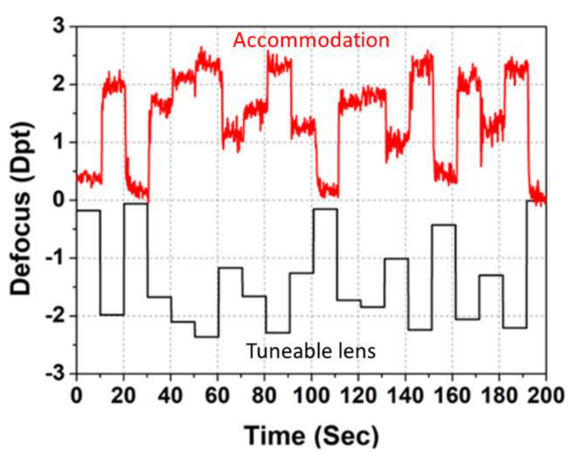

Fig 4. Temporal accommodative response of the young adult eye with a 4.5 mm pupil (red line) when subject to random step defocus changes (black) induced by a pupil-conjugated tuneable lens acting as stimulus. Some oscillations are present, but defocus blur is nearly fully compensated by the eye. These subconscious changes to accommodation happen typically within ~200 ms.

Animal studies show that the axial length in the developing eye can be altered with occluders and lenses [10,11] but is dampened in bright light [10]. In humans, myopia prevalence is increasing globally, albeit the statistics are skewed by parts of Asia where >90% of the population is currently myopic [4,12]. If, and how, the eye determines the sign of defocus is not fully understood, but it is believed to relate to similar mechanisms as those that drive accommodation as shown in Fig 4 [13]. There is a difference in light across the photoreceptors for light focused in front of or beyond the retina [14] and visual pigments near the outer segment entrance are newer than those near the tip of the outer segments, which could plausibly break the symmetry to defocus.

3 What causes myopia?

The factors causing myopia onset and progression are numerous with both genetic and environmental contributions. A high number of chromosome loci have been identified that are associated with heritability of myopia and largest for those where both parents are myopic [15,16]. Yet, the genetic understanding of myopia is still incomplete. In terms of environmental factors impacting on myopia, excessive near work and lack of time outdoors have been identified as the main causes [3,17]. Excessive near work perturbs emmetropization by favouring near vision whereas limited time outdoors impacts on viewing distances, light exposure, and pupil size. Light exposure releases dopamine in the retina that helps the neural pathways to adapt to daylight conditions [18]. Being outdoors means larger viewing distances with less dioptric demands [3]. A small outdoor pupil in daylight increases depth of focus, reduces aberrations, and improves the matching of the angular vergence of light to the acceptance angle of the photoreceptors [19]. A poor optical match of the anterior eye to that of the retina could be involved in erroneous emmetropization [19,20]. The angular vergence of light set by the eye pupil will determine whether light can leak or produce crosstalk as it propagates across the outer segments of the photoreceptors as shown in Fig 5. If the pupil is kept smaller than 3 mm, leakage and crosstalk will effectively be supressed. This remains true both for cones and rods, thereby also supporting the role of the peripheral retina in relation to myopia control and progression beyond the neural factors and aberrations [21]. Being outdoors in daylight not only restricts the pupil size, but also affects the observed spectrum of light and spatial frequencies experienced by the eyes [22]. Beyond the optics of the retina, there are variations in the choroidal thickness (normal thickness is around 250 - 350 μm) and severe choroidal thinning (tens of μm) happens in cases of high myopia related to biomechanical stretching [23]. Yet, this is likely a secondary effect, possibly useful as a biomarker, rather than the driving factor for myopia onset. It means that the retinal screen is moved further from the pupil which may limit the angular capture range of the photoreceptors [19]. Finally, there are diurnal and seasonal changes in intraocular pressure, axial length, and choroidal thickness that all impact on the light capture of the eye and retina. Interestingly, there have been reports that show high myopia in arctic regions where lack of daylight throughout the winter is evident [24].

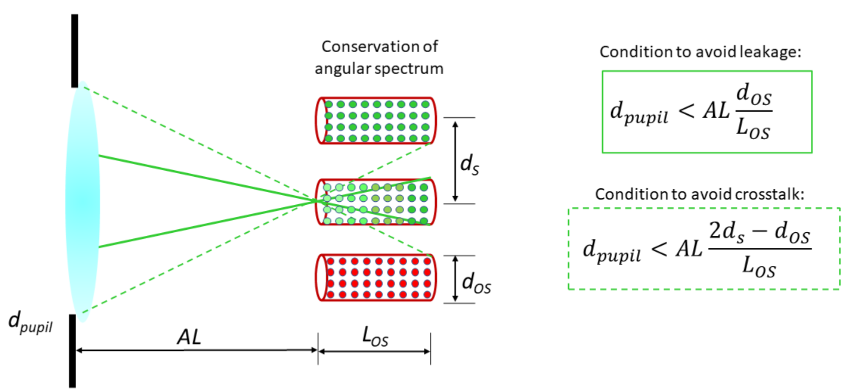

Fig 5. Geometrical wavevector requirement to avoid leakage and crosstalk for light propagating across the outer segments. A smaller pupil ensures that light traverses the retina along the axis of each photoreceptor rod and cone, without potential leakage or crosstalk, and therefore maximizes light capture.

4 How may we combat myopia?

Ideally, we avoid myopia onset altogether but, when this is no longer possible, how do we best implement control to reduce undesired axial elongation of the eye? Low-concentration atropine has been used for more than a century to reduce myopia progression [25,26]. This, and other similar drugs, lead to pupil mydriasis with the pupil being approximately 1 mm larger, thereby increasing light into the eye [27] but also altering the retinal muscarinic signalling pathways. How it impacts on the photoreceptors is still not known (would outer segments become shorter as suggested by Fig 5, if the pupil is larger?) but an increase in the electroretinography (ERG) a-wave has been reported for the cones [28]. Clearly, the field could benefit from acquiring more clinical data on photoreceptor packing, outer segment length and density in both emmetropic and myopic children and teenagers.

An alternative to atropine, is the use of orthokeratology that flattens the cornea to reduce the ocular power in myopia management [29]. Purposefully, focusing light in front of the peripheral retina is another common method to limit excessive eye growth [30]. Using the natural dispersion of the eye, it has been proposed to make use of UV or blue light to slow myopia progression [31]. Yet, the use of UV light, is highly problematic due to its potential impact on the crystalline lens. At the other end of the spectrum, bright red-light therapy has recently been introduced as a possible approach for myopia control [32]. Whether its effectiveness is due to the brightness of the light and dopamine release, or the constriction of the pupil is still unclear. Lately, several new contact lenses and spectacle glasses are being introduced for myopia management. In general, these either involve multifocal lenses, or they make use of a neutral central zone surrounded by an annular treatment zone with either smaller lenslets [33] or diffusers [34] that aim to alter the distribution of light in the peripheral retina and reduce the contrast. Finally, another idea is to alter the spectrum of light experienced by the eye, and though this limit undesired axial elongation [35]. All the present-day solutions to bring myopia progression to a halt, are for the most only partially successful. Understanding how light propagates as a wave, but is detected as a photon, is what underpins my own understanding of the retina and the photoreceptors. Ultimately, multidisciplinary skills are vital should we be able to fully solve the myopia puzzle.

Whether it was the use of blue or red light, dopamine, pupil and photoreceptors, novel lenses, or another fundamental idea that Seán had wanted to discuss with me in relation to myopia and his involvement with the company Equilume remains unknown [36]. Yet, I am sure that our discussion would have sparked new ideas as had happened in our earlier joint study on the detection of ocular drift, saccades, and tremor [37]. Here, we had discussed the feasibility for remote non-contact sensing of these and recent VR developments may make that feasible.

5 Conclusions

Understanding and treating myopia is a hot research topic where I only wish that Seán and I could have joined forces to find new solutions. The best moments were often those we shared with our students when promoting science or the unplanned chat over a coffee or tea. I have enjoyed every moment shared with Prof Seán (John) Sheridan who not only was an outstanding colleague, but also a great friend. He left behind an impressive legacy in the optical sciences and in his kind and warm personality that lives on with his students and family. I look forward to sharing many more happy moments and memories with them as we will continue to carry forward the light and warmth of heart that shone so strong in Seán. Honoured be his memory.

Acknowledgements

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References

1. Bozhevolnyi S I, Vohnsen B, Near-field optical holography, *Phys Rev Lett*, 77(1996)3351–3354.
2. Vohnsen B, Bozhevolnyi S I, Holographic approach to phase conjugation of optical near fields, *J Opt Soc Am A*, 14(1997)1491–1499.
3. Flitcroft D I, The complex interactions of retinal, optical and environmental factors in myopia aetiology, *Prog Ret Eye Res*, 31(2012)622–660.
4. Holden B A, Fricke T R, Wilson D A, Jong M, Naidoo K S, Sankaridurg P, Wong T Y, Naduvilath T J, Resnikoff S, Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050. *Ophthalmology*, 123(2016)1036–1042.
5. de Jong P T V M, Myopia: its historical contexts, *Br J Ophthalmol*, 102(2018)1021–1027.
6. Jones L A, Mitchell G L, Mutti D O, Hayes J R, Moeschberger M L, Zadnik K, Comparison of ocular component growth curves among refractive error groups in children, *Invest Ophthalmol Vis Sci*, 46(2005)2317–2327.
7. Yuodelis C, Hendrickson A, A qualitative and quantitative analysis of the human fovea during development, *Vis Res*, 26(1986)847–855.
8. Carmichael Martins A, Vohnsen B, Analysing the impact of myopia on the Stiles-Crawford effect of the first kind using a digital micromirror device, *Ophthal Physiol Opt*, 38(2018)273–280.
9. Choi S S, Garner L F, Enoch J M, The relationship between the Stiles-Crawford effect of the first kind (SCE-I) and myopia, *Ophthal Physiol Opt*, 23(2003)465–472.
10. Wallman J, Gottlieb M D, Rajaram V, Fugate-Wentzek L A, Local retinal regions control local eye growth and myopia, *Science*, 237(1987)73–77.
11. Ashby R S, Schaeffel F, The effect of bright light on lens compensation in chicks, *Invest. Ophthalmol*, *Vis Sci*, 51 (2010)5247–5253.
12. Dolgin E, The myopia boom, *Nature*, 519(2015)276–278.
13. Sharmin N, Vohnsen B, Monocular accommodation response to random defocus changes induced by a tuneable lens, *Vis Res*, 165(2019)45–53.
14. Vohnsen B, Directional sensitivity of the retina: A layered scattering model of outer-segment photoreceptor pigments, *Biomed Opt Exp*, 5(2014)1569–1587.
15. Hornbeak D M, Young T L, Myopia Genetics: A Review of Current Research and Emerging Trends, *Curr Opin Ophthalmol*, 20(2009)356–362.
16. Zhang X, Qu X, Zhou X, Association between parental myopia and the risk of myopia in a child, *Exp Ther Med*, 9(2015)2420–2428.
17. Huang H.-M, Chang D S.-T, Wu P.-C, The Association between Near Work Activities and Myopia in Children—A Systematic Review and Meta-Analysis, *PLoS ONE*, 10(2015)0140419; doi.org/10.1371/journal.pone.0140419.
18. Zhou X, Pardue M T, Iuvone P M, Qu J, Dopamine Signaling and Myopia Development: What Are the Key Challenges, *Prog Retin Eye Res*, 61(2017)60–71.
19. Vohnsen B, Geometrical scaling of the developing eye and photoreceptors and a possible relation to emmetropization and myopia, *Vision Res*, 189(2021)46–53.
20. Rozema J, Dankert S, Iribarren R, Emmetropization and non-myopic eye growth, *Surv Ophthalmol*, (2023); doi.org/10.1016/j.survophthal.2023.02.002.
21. Li Q, Fang F, Contribution of the retinal contour to the peripheral optics of human eye, *Vis Res*, 198(2022)108055; doi.org/10.1016/j.visres.2022.108055.
22. Flitcroft D I, Harb E N, Wildsoet C F, The Spatial Frequency Content of Urban and Indoor Environments as a Potential Risk Factor for Myopia Development, *Invest Ophthalmol Vis Sci*, 61(2020)42; doi. org/10.1167/iovs.61.11.42.
23. Read S A, Fuss J A, Vincent S J, Collins M J, Alonso-Caneiro D, Choroidal changes in human myopia: Insights from optical coherence tomography imaging, *Clin Exp Opt*, 102(2019)270–285.
24. van Rens G H M B, Arkell S M, Refractive errors and axial length among Alaskan Eskimos, *Acta Ophthalmol*, 69(1991)27–32.
25. Bullimore M A, Richdale K, Myopia Control 2020: Where are we and where are we heading?, *Ophthalmol Physiol Opt*, 40(2020)254–270.

26. Wu P.-C, Chuang M.-N, Choi J, Chen H, Wu G, Ohno-Matsui K, Jonas J B, Cheung C M G, Update in myopia and treatment strategy of atropine use in myopia control, *Eye*, 33(2019)3–13.
27. Kaymak H, Fricke A, Mauritz Y, Löwinger A, Klabe K, Breyer D, Lagenbucher A, Seitz B, Schaeffel F, Short-term effects of low-concentration atropine eye drops on pupil size and accommodation in young adult subjects, *Graefes Arch Clin Exp Ophthalmol*, 256(2018)2211–2217.
28. Khanal S, Rathod S N, Phillips J R, The acute effect of atropine eye drops on the human full-field electroretinogram, *Doc Ophthalmol*, 142(2021)315–328.
29. Cho P, Cheung S W, Edwards M, The longitudinal orthokeratology research in children (LORIC) in Hong Kong: a pilot study on refractive changes and myopic control, *Curr Eye Res*, 30(2005)71–80.
30. Erdinest N, London N, Lavy I, Berkow D, Landau D, Morad Y, Levinger N, Peripheral Defocus and Myopia Management: A Mini-Review, *Korean J Ophthalmol*, 37(2023)70–81.
31. Torii H, Kurihara T, Seko Y, Negishi K, Ohnuma K, Takaaki I, Kawashima M, Jiang X, Kondo S, Miyauchi M, Miwa Y, Katada Y, Mori K, Kato K, Tsubota K, Goto H, Oda M, Hatori M, Tsubota K, Violet Light Exposure Can Be a Preventive Strategy Against Myopia Progression, *eBioMedicine*, 15(2017)210–219.
32. Jiang Y, Zhu Z, X. Tan X, Kong X, Zhong H, Zhang J, Xiong R, Yuan Y, Zeng J, Morgan I G, He M, Effect of Repeated Low-Level Red-Light Therapy for Myopia Control in Children: A Multicenter Randomized Controlled Trial, *Ophthalmology*, 129(2022)509–519.
33. Lam C S Y, Tang W C, Qi H, Radhakrishnan H, Hasegawa K, To C H, Charman W N, Effect of Defocus Incorporated Multiple Segments Spectacle Lens Wear on Visual Function in Myopic Chinese Children, *Transl Vis Sci Technol*, 9(2020)11; doi.org/10.1167/tvst.9.9.11.
34. Rappon J, Chung C, Young G, Hunt C, Neitz J, Neitz M, Chalberg T, Control of myopia using diffusion optics spectacle lenses: 12-month results of a randomised controlled, efficacy and safety study (CYPRESS), *Br J Ophthalmol*, (2022); doi:10.1136/bjophthalmol-2021-321005.
35. Swiatczak B, Schaeffel F, Myopia: why the retina stops inhibiting eye growth, *Sci Rep*, 12(2022)21704: doi.org/10.1038/s41598-022-26323-7.
36. Walsh C M, Prendergast R L, Sheridan J T, Murphy B A, Blue light from light-emitting diodes directed at a single eye elicits a dose-dependent suppression of melatonin in horses, *Vet Jour*, 19 (2013)231–235.
37. Ryle J P, Vohnsen B, Sheridan J T, Simultaneous drift, microsaccades, and ocular microtremor measurement from a single noncontact far-field optical sensor, *J Biomed Opt*, 20(2015)027004; doi.org/10.1117/1.JBO.20.2.027004.

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Brian Vohnsen is an Associate Professor of Optical Physics in University College Dublin, Ireland, where he leads the Advanced Optical Imaging group that he founded in 2008. He is a Fellow of Optica (formerly OSA), and member of IOP, EOS, SPIE, and ARVO. He is Optica Chair of Vision and Color and on the ARVO annual meeting committee and publications committee. He is Advisory Editor on Papers in Physics, and past Topical Editor for Optics Letters. He is currently guest Editor for Biomedical Optics Express for a special issue on Visual and Physiological Optics and for Applied Sciences, and past Guest Editor for Ophthalmic and Physiological Optics, Journal of Ophthalmology, Micromachines, and Encyclopedia of Modern Optics. Originally from Denmark, he comes from a background in fundamental optical physics and photonics and has merged this with adaptive optics, wavefront sensing and visual optics, He has special interest in photoreceptor optics and the Stiles-Crawford effects and their impact on vision and on novel ophthalmics. In the UCD School of Physics he is Co-Chair of Equality-Diversity and Inclusion, past Head of Teaching and Learning, and Director for Postgraduate Studies in Physics.

Prof Brian Vohnsen has recently joined Asian J Phys as one of the editors.