CURRICULUM VITÆ: DR SHABAN DEMIREL
APRIL, 2013

Name Dr Shaban Demirel BScOptom, PhD.

Current Position Associate Scientist, Devers Eye Institute, Legacy Health.
Director, Visual Field Reading Center.

Previous Positions Assistant Scientist, Devers Eye Institute, Legacy Health. (2002–2010)
Assistant Professor, Indiana University, Optometry School. (1997–2001)
Postdoctoral Research Fellow, Department of Ophthalmology, University of California, Davis. (1995–1997)

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ACADEMIC QUALIFICATIONS

1. BScOptom, The University of Melbourne, Department of Optometry, December 1989.
2. PhD, The University of Melbourne, November 1995.
3. Postdoctoral Fellowship, UC Davis, Department of Ophthalmology, 1995 – 1997.

TEACHING EXPERIENCE

Optometric / Ophthalmologic Teaching

1. Teaching assistant, Laboratories in Physiological Optics, Department of Optometry, University of Melbourne, 1991 – 95.
2. Tutor, Clinical Methods Laboratory in perimetry, Department of Optometry, University of Melbourne, 1993 – 94.
3. Lecturer, 3rd year Diseases of the Eye in pupillary function and headaches, Department of Optometry, University of Melbourne, 1993.
4. Clinical Supervisor, senior year optometry clinics, Department of Optometry, University of Melbourne, 1993 – 94.
5. Clinical Examiner, senior year optometry clinics, Department of Optometry, University of Melbourne, 1994.
6. Instructor, Resident Orientation in Optics and Refraction, Department of Ophthalmology, University of California, Davis, 1997.

7. Examiner, second year optometry clinics, School of Optometry, Indiana University, 1998 – 2001.
8. Course coordinator and instructor, V746 Ocular Disease III, Neuro-optometry, School of Optometry, Indiana University, 1998 – 2001.
9. Course coordinator and instructor, V516 Ocular Physiology, School of Optometry, Indiana University, 1998 – 2001.
10. Instructor, V644 Ocular Disease II, School of Optometry, Indiana University, 1998 – 2001.
11. Course coordinator and instructor, V773 Classics in Physiological Optics, School of Optometry, Indiana University, 1998 – 2001.
12. Course coordinator, V765 Visual Sciences Seminar, School of Optometry, Indiana University, spring session 1999 – 2001.
13. Course coordinator and instructor, V551 Clinical Optometry I, School of Optometry, Indiana University, spring session 1999.
14. Committee member for one PhD student in the Vision Sciences Graduate Program.
15. Committee member for one OD/MS student in the combined Vision Sciences / OD program.

Continuing Professional Education Presentations

1. *Anatomy of the Visual Pathways and Perimetric Methods*. The Western Victorian Division of the Australian Optometric Association 2-day continuing education program. April 1993.
2. *Basic Visual Fields.* Victorian College of Optometry, continuing education course. July 1993.
3. *Anatomy of the Visual Pathway and Perimetric Methods.* The Tasmanian Division of the Australian Optometric Association 2-day continuing education program. April 1994.
4. *Perimetry: The Next Step.* Victorian College of Optometry, continuing education course. July 1994.
5. *Reliable Clinical Perimetry.* Victorian College of Optometry, continuing education lectures. March 1995.
6. *Structure - Function Correlations in Glaucoma.* Department of Optometry and Vision Sciences, University of Melbourne, Departmental lecture series. February 1997.
7. *New Perimetric Methods*. IU School of Optometry Summer CE Series. July 1998.
8. *New Tests in Visual Field Evaluation – Do They Work and Can I Afford Them?* IU School of Optometry Summer CE Series. July 1999.
9. *Disease detection through topographical assessment of the visual system*. Victorian College of Optometry, continuing education lectures. July 2000.
10. *The Art and Science of Perimetry: which test, when, why and how often*. Thorny Issues Technicians meeting, continuing education lectures. June 2002.
11. *Dysfunctional RGCs in Glaucoma*. Casey Eye Institute / Devers Eye Institute Grand Rounds. October 2004.
12. *Structure - Function relationships in clinical glaucoma. Why aren't they better?* Casey Eye Institute / Devers Eye Institute Grand Rounds. March 2007.
13. *Where could the problem be? Dissecting the visual system without a knife.* Thorny Issues Technicians meeting, continuing education lectures. September 2008.
14. *The Basics of Color Vision: How it works, how it goes wrong & how we test it.* Thorny Issues Technicians meeting, continuing education lectures. September 2009.
15. *Doctor, will I go blind from glaucoma*? Thorny Issues in Ophthalmology Conference. Portland, OR. September 16th, 2011.
16. *Detecting visual field change: Lessons from the OHTS*. PMOS monthly CE meeting. Portland, OR. September 19th, 2011.

CLINICAL EXPERIENCE

1. Clinical Associate, Victorian College of Optometry. 1989 – 1994.
2. Part-time Private Optometric Practice. Frank Keogh & Associates. 1990 – 1994.
3. Staff Optometrist, Department of Ophthalmology, Royal Melbourne Hospital, Parkville, Victoria, 1993.
4. Clinical Examiner, Indiana University School of Optometry student clinics. 1998 – 2001.

OTHER PROFESSIONAL ACTIVITIES

1. Associate Editor for the Optometric Glaucoma Society (OGS) e-Journal. 2005 – 2010.
2. Reviewer for Acta Ophthalmologica.
3. Reviewer for American Journal of Ophthalmology.
4. Reviewer for British Journal of Ophthalmology.
5. Reviewer for Clinical and Experimental Optometry.
6. Reviewer for Clinical and Experimental Ophthalmology.
7. Reviewer for Current Eye Research.
8. Reviewer for Eye.
9. Reviewer for Investigative Ophthalmology and Vision Science.
10. Reviewer for Journal of Glaucoma.
11. Reviewer for Journal of Vision
12. Reviewer for Ophthalmic and Physiological Optics.
13. Reviewer for Optometry and Vision Science.
14. Reviewer for Quarterly Review of Biology.
15. Reviewer for Vision Research.
16. Member of AIGS (now WGA) Consensus Panel for Structure-Function relationships in glaucoma. SWAP committee chair, December 2003.
17. Executive Committee member for the OGS, 2003 – 2012.
18. Web committee chairman and web maintainer for OGS, 2003 – 2012.
19. Co-host, International Perimetric Society (IPS) Meeting, Portland, Oregon, July 2006.
20. Executive Committee Imaging and Perimetry Society (IPS), 2006 – Present.
21. Central Reader for Memantine Visual Field Reading Center, 2002 – 2007.
22. Co-Investigator for OHTS Visual Field Reading Center, 2003 – 2008
23. Central Reader for Pfizer Asenapine Visual Field Reading Center, 2006 – 2009.
24. Central Reader for Pfizer Lyrica Visual Field Reading Center, 2007 – Present.
25. Legacy Health IRB committee member, 2007 – Present.
26. Vision Science Section Vice Chair, American Academy of Optometry, 2008 – 2010.
27. Vision Science Section Chair, American Academy of Optometry, 2010 – 2012.
28. Central Reader for Boehringer Ingelheim Mirapex Visual Field Reading Center, 2010.
29. Vision Science Diplomate Vice Chair, American Academy of Optometry, 2012 – present.

MEMBERSHIPS OF PROFESSIONAL ORGANIZATIONS

1. Association for Research in Vision and Ophthalmology (ARVO)
2. Fellow of the American Academy of Optometry (FAAO)
3. Optometric Glaucoma Society (OGS – Founding member)
4. World Glaucoma Association (WGA)
5. Imaging and Perimetry Society (IPS – Executive committee member)
6. North American Perimetric Society (NAPS)

7. Glaucoma Progression Scholars (GPS)
8. American Association for the Advancement of Science (AAAS)

INVITED TALKS

1. Japanese Ophthalmological Society Annual Meeting. March 2004. *New Developments in the Short Wavelength Sensitive Cone System.*
2. University of Houston College of Optometry Periopsia Lecture Series, March 2005. *Dysfunctional RGCs in Glaucoma.*
3. Indiana University School of Optometry Oxyopia Lecture Series, March 2009. *Predicting glaucoma progression. Is it possible?*
4. University of Alabama at Birmingham Visiting Lecture Series, April 2013. Estimating rates of visual function change in chronic eye diseases. Superior prognostic information over binary indicators of 'progression'

RESEARCH EXPERIENCE

S-cone resolution measures: It is well known that the human s-cone system is sparsely represented at the retinal level. The number of photoreceptors and ganglion cells devoted to processing stimuli that isolate s-cones is quite low. Consequently, if these cells are damaged during the course of retinal disease, we can expect to see functional alterations in these subjects. By using visual stimuli that isolate the s-cone system and in particular looking at the resolution acuity of this system, it should be possible to develop a functional measure of ganglion cell density as a means of following disease development and progression.

Psychophysical assessment of retinal disease: Almost all disease entities stand a better chance of successful treatment outcomes when detected earlier. This part of the research effort of my lab is directed at identifying psychophysical tests of vision that can identify retinal disease as early as possible. While glaucoma is most strongly emphasized, diabetes and other retinal diseases are also amenable to this type of investigation. In addition, corroborative evidence for functional deficits is also being sought using electrophysiological procedures such as multifocal electroretinography.

Mechanism of cell death in glaucoma: There is some debate in the literature about the mode of cell death in glaucoma. It is believed by many that the mode of cell death is primarily a process called apoptosis. This process, once begun is believed to take only a short time between a cell appearing normal and a cell being obviously dead. The focus of this research effort is to determine if the same type of scenario is evident in the functional realm. For example, if cells are quite normal right up until shortly before they die then there should not be functional evidence of abnormally behaving cells. There should, however, be evidence of a reduced number of retinal ganglion cells. Through novel stimulus combinations, electrophysiological measures and mathematical modeling of how individual cell responses determine the overall performance it should be possible to shed some light on the earliest evidence of abnormal cell behaviour. This

finding will have important implications for furthering our understanding of the glaucomatous disease process.

Detecting progressive change in glaucoma: Using novel statistical tests (classification and regression trees, conditional inference trees, random forests) we have been searching for biomarkers that place a patient with glaucoma at risk for rapid progression. Using long sequences of visual fields, optic nerve imaging studies, intraocular pressure, central corneal thickness and other ocular factors, together with systemic health (e.g. blood pressure dysregulation) and demographic factors (age, gender, race) we have been able to determine which patients progress most rapidly and then use baseline findings to predict future change. We have found that very subtle changes in the visual field can be used to predict future change in the appearance of the optic nerve. Currently we are bringing quality of life measures into this equation in an attempt to use data collected very early in a patient's disease history to predict eventual change in their quality of life. Developing better predictive methods will allow physicians to treat 'at risk' glaucoma patients earlier and more aggressively but also allow them to follow and treat patients that are unlikely to progress more conservatively. This should lead to better outcomes on a per patient basis (less visual disability in the at risk patients and fewer medication side effects in the 'unlikely to progress' patients) and better resource allocations within the wider ophthalmic medical system.

GRANT FUNDING (COMPLETED, CURRENT, PENDING & APPLICATIONS IN REVIEW)

1 Glaucoma Research Foundation Pilot Project Grants
Project duration: 3/1/02-2/28/03 (Complete)
Project Title: RGC dysfunction in patients with early glaucomatous visual abnormality.
Role: Principal Investigator.

2 NIH/NEI U10-EY-09307 (Keltner)
Project duration: 9/30/92-12/31/08 (Complete)
Project Title: Ocular Hypertension Treatment Study Visual Field Reading Center.
The major goals of this project are to process visual field data for the OHTS trial, analyze visual field data and prepare manuscripts for publication.
Role: Co-Investigator.

3 Pfizer research contract
Project duration: 2006 – 2008 (Complete)
Project Title: Patient Enrichment Study-Determining progression in glaucoma using structural and functional measures.
The main goals of this study were to assist the sponsor in targeting recruitment of patients with glaucoma that are most likely to progress and to determine endpoints that would be sensitive to change in a clinical drug trial.
Role: Principal Investigator.

4 NIH/NEI R21-EY-018698 (Levine)
Project duration: 7/1/09-6/30/11 (Complete)

Project Title: Measuring and predicting visual field progression with longitudinal-survival CART.
The goals of this project are to develop classification and regression tree methods for longitudinal survival data that assist in prediction of which eyes with glaucoma or high-risk ocular hypertension are likely to undergo progression.
Role: Co-Investigator.

5 CDC Comparative Effectiveness Grant (Mansberger)
Project duration: July, 2010 – July, 12 (Complete)
Project Title: The Northwest Vision Impairment Prevention Project.
This project will compare the effectiveness of telemedicine to traditional surveillance methods (annual eye exams in eye care provider's office) for detecting diabetic retinopathy. We will address three critical gaps in knowledge: 1) the efficacy for detecting diabetic retinopathy with telemedicine and traditional surveillance methods; 2) the health behavior factors related to receiving annual diabetic eye examinations with telemedicine and traditional surveillance methods; and 3) the cost-effectiveness of telemedicine and traditional surveillance methods.
Role: Co-Investigator.

6 NIH/NEI R21-EY-019674 (Demirel)
Project duration: 10/1/09-9/30/14 (Active)
Project Title: Predicting the rate of progression in glaucoma
This project seeks to predict the future rate of vision loss in patients with glaucoma, both earlier and more accurately than is currently possible. If a patient is at risk of rapid disease progression, possibly resulting in eventual visual disability or blindness, this may warrant more frequent monitoring and/or more aggressive therapy. The project will also provide new information about glaucomatous pathophysiology, which can be used to direct future developments in diagnostic testing and treatment strategies.
Role: Principal Investigator.

7 NIH/NEI R01-EY-021281 (Burgoyne)
Project duration: 12/1/10-11/30/15 (Active)
Project Title: Optic Nerve Head SDOCT Imaging in Glaucoma.
The clinical detection of the onset and progression of glaucomatous damage to the optic nerve head (ONH) is central to the care of every glaucoma patient. We propose to use 870 nm and 1060 nm Heidelberg Spectralis Spectral Domain Optical Coherence Tomography (SDOCT) to characterize the onset and progression of ONH structural change within pre and post- laser SDOCT ONH data sets from both eyes of 70 unilateral experimental glaucoma (EG) monkeys and 250 ocular hypertensive and early glaucoma patients. In this project we will translate 11 years of NIH-funded, post-mortem monkey work to an in-vivo imaging modality that will be shown to have important and novel clinical care applications in humans.
Role: Co-Investigator.

8 NIH/NEI R01-EY-020922 (Gardiner)
Project duration: 8/1/11-7/31/16 (Active)
Project Title: Functional Testing for Glaucoma.
This project aims to explain and reduce the variability observed in functional testing of the visual field in patients with moderate and advanced glaucoma, with the long-term aim of improving functional testing. The results of this study will allow more accurate assessment

of a patient's current status and response to treatment. This will improve the ability to design an appropriate and cost-efficient personalized management strategy to preserve vision, with the aim of maintaining a patient's quality of life.
Role: Co-Investigator.

9 Heidelberg Engineering (Demirel)
Project duration: 6/1/12-2/28/13 (Active)
Project Title: Spectralis Normative Database Study.
A multi-center, prospective, observational (non-interventional) study to measure structural parameters of the optic nerve head, the peripapillary retinal nerve fiber layer, and the macula using the Heidelberg Spectralis OCT device. This study is conducted in normal Caucasian volunteers. The main goal of the study is to provide the range of these structural parameters in normal eyes.
Role: Principal Investigator.

PUBLICATIONS

Articles

1. **Demirel S**, Vingrys AJ. Fixational instability during perimetry and the blindspot monitor. In: Mills RP, ed. *Perimetry Update 92/93*. Amsterdam, Kugler Publications, 1993:515-520.
2. Vingrys AJ, **Demirel S**. The effect of fixation loss on perimetric reliability. In: Mills RP, ed. *Perimetry Update 92/93*. Amsterdam, Kugler Publications, 1993:521-526.
3. **Demirel S**, Vingrys AJ. Eye movements during perimetry and the effect that fixational instability has on perimetric outcomes. *J Glaucoma* 1994;3:28-35.
4. **Demirel S**, Vingrys AJ. Acceptable false response rates for reliable perimetric outcomes. In: Mills RP, ed. *Perimetry Update 94/95*. Amsterdam, Kugler Publications, 1995:83-88.
5. Vingrys AJ, **Demirel S** and Kalloniatis M. Multi-dimensional colour, flicker and increment perimetry. In: Mills RP, ed. *Perimetry Update 94/95*. Amsterdam, Kugler Publications, 1995:159-166.
6. Miller M, Fendrich R, Eliassen J, **Demirel S**, Gazzaniga G. Transcranial magnetic stimulation: delays in visual suppression due to luminance changes. *Neuroreport*, 1996;7:1740-1744.
7. **Demirel S**, Johnson CA. Short wavelength automated perimetry (SWAP) in ophthalmic practice. *J Amer Optom Assoc*, 1996;67:451-6.
8. **Demirel S**, Johnson CA. Short wavelength automated perimetry (SWAP). *Optometry Today*, 1996;4:30-2.
9. **Demirel S**, Johnson CA, Fendrich R, Vingrys AJ. The slope of frequency-of-seeing curves in normal, amblyopic and pathological vision, in *Vision Science and Its Applications,* Vol. 1, 1997 OSA Technical Digest Series (Optical Society of America, Washington DC, 1996), 244-47.
10. **Demirel S**, Johnson CA. Validation of a risk model for glaucomatous field loss: application to standard automated perimetry and SWAP. In: Wall M, Heijl A, Eds. *Perimetry Update 96/97*. Amsterdam, Kugler Publications, 1997:275-280.
11. Johnson CA, **Demirel S**. The role of spatial and temporal factors in frequency doubling perimetry. In: Wall M, Heijl A, Eds. *Perimetry Update 96/97*. Amsterdam, Kugler Publications, 1997:13-19.
12. Lynch S, Johnson CA, **Demirel S**. Is early damage in glaucoma selective for a particular cell type or pathway? In: Wall M, Heijl A, Eds. *Perimetry Update 96/97*. Amsterdam, Kugler Publications, 1997:253-262.
13. Vingrys AJ, **Demirel S**. Temporal modulation thresholds isolate mechanisms with different adaptational and spatial properties, in *Vision Science and Its Applications,* Vol. 1, 1998 OSA Technical Digest Series (Optical Society of America, Washington DC, 1997), 78-81.
14. Vingrys AJ, **Demirel S**. False response monitoring during automated perimetry. *Optom Vis Sci*, 1998;75:513-517.
15. Fendrich R, **Demirel S**, Danziger S. The oculomotor gap effect without a foveal fixation point. *Vision Res*, 1999;39:833-841.
16. **Demirel S**, Johnson CA, Thibos LN. Age and eccentricity effects on grating detection and grating resolution automated perimetry. Wall M, Wild JM, Eds. *Perimetry Update 98/99*. The Hague/The Netherlands, Kugler Publications, 1999:229-239.
17. **Demirel S**, Johnson CA. Isolation of short wavelength sensitive mechanisms in normal and glaucomatous visual field regions. *J Glaucoma*, 2000;9:63-73.
18. **Demirel S**, Johnson CA. Incidence and prevalence of short wavelength automated perimetry (SWAP) deficits in ocular hypertensive patients. *Am J Ophthalmol*, 2001;139:709-715.
19. Anderson RS, Zlatkova MB, **Demirel S**. What limits detection and resolution of short-wavelength sinusoidal gratings across the retina? *Vision Res*, 2002;42:981-990.
20. Anderson RS, Coulter E, Zlatkova MB, **Demirel S**. Short-wavelength acuity: optical factors affecting detection and resolution of blue-yellow sinusoidal gratings in foveal and peripheral vision. *Vision Res*, 2003;43:101-107.

21. Beirne RO, Logan JF, Zlatkova MB, Jackson AJ, Rankin SJ, **Demirel S**, Anderson RS. Peripheral resolution for achromatic and SWS gratings in early to moderate glaucoma and the implications for selective ganglion cell density loss. *Invest Ophthalmol Vis Sci.* 2003;44:4780-6.

22. Fortune B, Goh K, **Demirel S**, Novitsky K, Mansberger S, Johnson CA, Cioffi GA. Detection of glaucomatous visual field loss using multifocal VEP. In: Henson, DB and Wall M Eds. *Perimetry Update 02/03*. The Hague/The Netherlands, Kugler Publications. 2004: 251-260.

23. **Demirel S,** Flanagan J, Sample P. Short wavelength automated perimetry. In: Weinreb RN and Greve EL Eds. *Glaucoma Diagnosis. Structure and Function*. The Hague/The Netherlands, Kugler Publications, 2004: 99-107.

24. Fortune B, Zhang X, Hood D, **Demirel S**, Johnson CA. Normative ranges and specificity of the multifocal VEP. *Doc Ophthalmol*. 2004;109:87-100.

25. Mansberger SL, **Demirel S**. Early detection of glaucomatous visual field loss: why, what, where, and how. *Ophthalmol Clin North Am*. 2005;18:365-73.

26. Fortune B, **Demirel S**, Zhang X, Hood DC, Johnson CA. Repeatability of normal multifocal VEP: implications for detecting progression. *J Glaucoma*. 2006;15:131-41.

27. Gardiner SK, **Demirel S**, Johnson CA. Modeling the sensitivity to variability relationship in perimetry. *Vision Res*. 2006;46:1732-45.

28. Levine RA, **Demirel S**, Fan J*, et al.* Asymmetries and visual field summaries as predictors of glaucoma in the ocular hypertension treatment study. *Invest Ophthalmol Vis Sci*. 2006;47:3896–3903.

29. Newkirk MR, Gardiner SK, **Demirel S**, Johnson CA. Assessment of false positives with the Humphrey Field Analyzer II perimeter with the SITA algorithm. *Invest Ophthalmol Vis Sci*. 2006;47:4632-7.

30. Fortune B, **Demirel S**, Zhang X, Hood DC, Patterson E, Jamil A, Mansberger SL, Cioffi GA, Johnson CA. Comparing multifocal VEP and standard automated perimetry in high-risk ocular hypertension and early glaucoma. *Invest Ophthalmol Vis Sci*. 2007;48:1173-80.

31. Fortune B, Zhang X, Hood DC, **Demirel S**, Patterson E, Jamil A, Mansberger SL, Cioffi GA, Johnson CA. Effect of Recording Duration on the Diagnostic Performance of Multifocal Visual-evoked Potentials in High-risk Ocular Hypertension and Early Glaucoma. *J Glaucoma*. 2008;17:175-182.

32. Zeppieri M, **Demirel S**, Kent K, Johnson CA. Perceived spatial frequency of sinusoidal gratings. *Optom Vis Sci.* 2008;85:318-329.

33. Gardiner SK, Swanson WH, **Demirel S**, McKendrick AM, Turpin A, Johnson CA. A two-stage neural spiking model of visual contrast detection in perimetry. *Vision Res*. 2008;48:1859-69.

34. Gardiner SK, **Demirel S**, Johnson CA. Is there evidence for continued learning over multiple years in perimetry? *Optom Vis Sci*. 2008;85:1043-8.

35. Gardiner SK, **Demirel S**. Assessment of patient opinions of different clinical tests used in the management of glaucoma. *Ophthalmology*. 2008;115:2127-31.

36. **Demirel S**, Fortune B, Fan J, *et al*. Predicting progressive glaucomatous optic neuropathy using baseline standard automated perimetry data. *Invest Ophthalmol Vis Sci.* 2009;50:674-80.

37. Fortune B, **Demirel S**, Bui BV. Multifocal visual evoked potential responses to pattern-reversal, onset, offset, and sparse pulse stimuli. *Vis Neurosci*. 2009;26:227-35.

38. Strouthidis NG, **Demirel S**, Asaoka R, Cossio-Zuniga C, Garway-Heath DF. The Heidelberg Retina Tomograph glaucoma probability score reproducibility and measurement of progression. *Ophthalmology*. 2010;117(4):724-729.

39. Eisner A, **Demirel S**. Variability in short wavelength automated perimetry: a dependence on phytoestrogen consumption? *Acta Ophthalmol*. 2011;89(3)e217:224.

40. Gardiner SK, **Demirel S**, Johnson CA. Perimetric indices as predictors of future glaucomatous functional change. *Optom Vis Sci.* 2011;88(1):56-62.

41. Gardiner SK, **Demirel S**, Johnson CA, Swanson WH. Assessment of linear-scale indices for perimetry in terms of progression in early glaucoma. *Vision Res*. 2011;51(16):1801-1810.

42. Gardiner SK, Johnson CA, **Demirel S.** Cup size predicts subsequent functional change in early glaucoma. *Optom Vis Sci.* 2011;88(12):1470-1476.

43. Sigal IA, Yang H, Roberts MD, Grimm JL, Burgoyne CF, **Demirel S**, Downs JC. IOP-induced lamina cribrosa deformation and scleral canal expansion: independent or related? *Invest Ophthalmol Vis Sci*. 2011;52(12):9023-9032.

44. Levine RA, Fan J, Strickland PO, **Demirel S**. Frailty modeling via the empirical Bayes Hastings sampler. *Comput Stat Data Anal*. 2012;56(6):1303-1318. Epub ahead of print Oct 1st, 2011.

45. **Demirel S,** De Moraes CG, Gardiner SK, Liebmann JM, Cioffi GA, Ritch R, Gordon MO, Kass MA, for the Ocular Hypertension Treatment Study. The rate of visual field change in the Ocular Hypertension Treatment Study. *Invest Ophthalmol Vis Sci*. 2012;53(1):224-227.

46. De Moraes CG, **Demirel S,** Gardiner SK, Liebmann JM, Cioffi GA, Ritch R, Gordon MO, Kass MA, for the Ocular Hypertension Treatment Study. Effect of treatment on the velocity of visual field progression in the Ocular Hypertension Treatment Study Observation Group. *Invest Ophthalmol Vis Sci*. 2012;53(4):1704-1709.

47. **Demirel S**, Anderson RS, Dakin SC, Thibos LN. Detection and resolution of vanishing optotype letters in central and peripheral vision. *Vision Res*. 2012;59:9-16. Epub ahead of print March 3rd, 2012.

48. Gardiner SK, Johnson CA, **Demirel S**. Factors predicting the rate of functional progression in early and suspected glaucoma. *Invest Ophthalmol Vis Sci*. 2012;53(7):3598-3604.

49. Gardiner SK, Johnson CA, **Demirel S**. The effect of test variability on the structure-function relation in early glaucoma. *Graefes Arch Clin Exp Ophthalmol*. 2012;250(12):1851-61.

50. De Moraes CG, **Demirel S,** Gardiner SK, Liebmann JM, Cioffi GA, Ritch R, Gordon MO, Kass MA, for the Ocular Hypertension Treatment Study. Rate of visual field progression in eyes with optic disc hemorrhages in the Ocular Hypertension Treatment Study. *Arch Ophthalmol*. 2012;130(12):1541-6.

51. Gardiner SK, **Demirel S,** De Moraes CG, Liebmann JM, Cioffi GA, Ritch R, Gordon MO, Kass MA, for the Ocular Hypertension Treatment Study. Series length used during trend analysis affects sensitivity to changes in progression rate in the Ocular Hypertension Treatment Study (OHTS). *Invest Ophthalmol Vis Sci*. 2013;54:1252-9.

52. Goren D, Gardiner SK, Johnson CA, **Demirel S**. Rates of change over time for Matrix FDT and standard automated perimetry. In review *Invest Ophthalmol Vis Sci.*

53. Goren D, **Demirel S,** Fortune B, Gardiner SK. Structure-function correlations between standard automated perimetry and three measures of retinal nerve fiber layer thickness. In review *Ophthalmology.*

54. Gardiner SK, **Demirel S,** Gordon MO, Kass MA, for the Ocular Hypertension Treatment Study. Seasonal changes in visual field sensitivity and intraocular pressure in the Ocular Hypertension Treatment Study (OHTS). Ophthalmology. Ophthalmology. 2013 Jan 25. pii: S0161-6420(12)00968-2. [Epub ahead of print].

55. Gardiner SK, Ren R, Yang H, Fortune F, Burgoyne CF, **Demirel S**. A method to estimate the amount of neuroretinal rim tissue in glaucoma: comparison with current methods for measuring rim area. In review *Invest Ophthalmol Vis Sci.*

56. Gardiner SK, Fortune B, Demirel S. Signal-to-noise ratios for structural and functional tests in glaucoma. In review *Invest Ophthalmol Vis Sci.*

57. Ren R, Yang H, Gardiner SK, Fortune B, Hardin C, **Demirel S**, Burgoyne CF. Anterior lamina cribrosa surface depth, age and visual field sensitivity in patients with ocular hypertension and glaucoma. In review *Ophthalmology*.

Presentations at professional meetings

A1. **Demirel S**, Vingrys AJ. The assessment and effects of fixation loss during perimetry. *Clin Exp Optom* 1991;74(6):219.

A2. Vingrys AJ, Kalloniatis M, **Demirel S**. Detection of colour, flicker and luminance

increments. *ARVO Abstracts, Invest Ophthalmol Vis Sci*, 1992;33(Suppl):S967.

A3. **Demirel S**, Vingrys AJ. Temporal modulation as a perimetric variable. *Clin Exp Optom* 1993;76(5):179.

A4. **Demirel S**, Vingrys AJ. Fixational instability during perimetry and the blindspot monitor. In: Mills RP, ed. *Perimetry Update 92/93*. Amsterdam, Kugler Publications, 1993:515-520. International Perimetric Society biannual meeting, Kyoto, Japan.

A5. Vingrys AJ, **Demirel S**. The effect of fixation loss on perimetric reliability. In: Mills RP, ed. *Perimetry Update 92/93*. Amsterdam, Kugler Publications, 1993:521-526. International Perimetric Society biannual meeting, Kyoto, Japan.

A6. **Demirel S**, Vingrys AJ. Acceptable false response rates for reliable perimetric outcomes. In: Mills RP, ed. *Perimetry Update 94/95*. Amsterdam, Kugler Publications, 1995:83-88. International Perimetric Society biannual meeting, Washington D.C., USA.

A7. Vingrys AJ, **Demirel S** and Kalloniatis M. Multi-dimensional colour, flicker and increment perimetry. In: Mills RP, ed. *Perimetry Update 94/95*. Amsterdam, Kugler Publications, 1995:159-166. International Perimetric Society biannual meeting, Washington D.C., USA.

A8. Brandt JD, Johnson CA, **Demirel S**. Comparison between subjective and objective cup-to-disc (C/D) ratio assessment in ocular hypertension. *ARVO Abstracts, Invest Ophthalmol Vis Sci*, 1996;37(Suppl):S664.

A9. **Demirel S**, Johnson CA. Analysis of short wavelength automated perimetry (SWAP) in ocular hypertensives who develop visual field loss. *ARVO Abstracts, Invest Ophthalmol Vis Sci*, 1996;37(Suppl):S946.

A10. Fendrich R, **Demirel S**, Danziger S. The oculomotor gap effect without a foveal fixation point. *Society for Neuroscience Abstracts*, 1996;22:2032.

A11. Fendrich R, **Demirel S**, Johnson CA. Visual thresholds and frequency-of-seeing curves near the blind spot: stabilized and nonstabilized perimetry. *ARVO Abstracts, Invest Ophthalmol Vis Sci*, 1996;37(Suppl):S1081.

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