

# Safal Khanal OD, PhD, FAAO

---

HPB 400C, 1716 University Blvd., Birmingham, Alabama 35233, United States  
Phone: (+1) 205 616 3543; Email: skhanal@uab.edu

## Academic Qualifications

---

- 2019 Doctor of Philosophy, The University of Auckland, New Zealand  
*Thesis: Physiological responses of human retina and choroid to retinal image defocus: Implications for myopia (Supervisor: Dr. John Phillips)*
- 2014 Doctor of Optometry (Dean's Lister), Southwestern University, Cebu, Philippines
- 2012 Bachelor of Optometry, Tribhuvan University, Kathmandu, Nepal  
*Thesis: Retinal nerve fiber layer and macular thickness in glaucomatous Nepalese eyes and their relationship with visual field sensitivity (Supervisor: Dr. Madhu Thapa)*

## Professional Qualification/Licenses

---

- 2020– Optometry T-License, Alabama Board of Optometry (Number: T-246-TA-B76)
- 2016– Fellow of the American Academy of Optometry
- 2015– Optometry license, Nepal (Number: A-T-121 OPT/A-84 OPT)

## Professional Appointments

---

- 2021– Assistant Professor, School of Optometry, University of Alabama at Birmingham, USA
- 2019–2021 Postdoctoral Fellow, School of Optometry, University of Alabama at Birmingham, USA  
(Mentors: Profs. Timothy J. Gawne, Thomas T. Norton, and Jason J. Nichols)
- 2019 Postdoctoral Fellow, Myopia Lab and Dakin Lab, The University of Auckland, NZ  
(Mentors: Dr. John Phillips and Prof. Steven Dakin)
- 2019 Research Assistant, Myopia Lab and Dakin Lab, The University of Auckland, NZ
- 2016–2019 Graduate Teaching Assistant, School of Optometry and Vision Science, Faculty of Medical and Health Sciences, The University of Auckland, NZ.
- 2017–2018 Area Officer, Grafton Residences, Campus Life, The University of Auckland, NZ
- 2015–2015 Consultant Optometrist, Grande International Hospital, Kathmandu, Nepal
- 2012–2013 Clinical Optometrist, Siddhartha and Sudrishti Eye Clinic, Kathmandu, Nepal

## Research Areas of Interest

---

Eye growth and refractive development; Animal and human myopia; Tear film lipids; Dry eye disease; Ocular electrophysiology; Ocular imaging

## Publications

---

### *Peer-reviewed journal articles*

- 2021 **Khanal S, Bai Y, Ngo W, Wilson L, Barnes S, Nichols KK, Nichols JJ.** Human meibum and tear film derived cholesteryl and wax esters in meibomian gland dysfunction and tear film structure (Under review in the Ocular Surface)

- Bai Y, Ngo W, **Khanal S**, Nichols JJ. Characterization of the Thickness of the Tear Film Lipid Layer in Meibomian Gland Dysfunction using High Resolution Optical Microscopy (Under review in the Ocular Surface)
- Logan NS, Radhakrishnan H, Cruickshank F, Allen PM, Bandella PK, Davies LN, Hasebe S, **Khanal S**, Schmid KL, Vera-Diaz FA, Wolffsohn JS. IMI: Accommodation and Binocular Vision in Myopia Development and Progression. *Invest. Ophthalmol. Vis. Sci.* 2021;62(5):4.
- Khanal S**, Norton TT, Gawne TJ. Amber light treatment produces hyperopia in tree shrews. *Ophthalmic Physiol Opt.* 2021 Aug 11.
- Norton TT, **Khanal S**, Gawne TJ. Tree shrews do not maintain emmetropia in initially-focused narrow-band cyan light. *Exp. Eye Res.* 2021 Mar 10:108525.
- Ramamoorthy P, **Khanal S (co-first author)**, Nichols JJ. Inflammatory proteins associated with contact lens-related dry eye. *Contact Lens and Anterior Eye.* 2021 Apr 3:101442.
- Khanal S**, Ngo W, Wilson L, Barnes S, Nichols KK, Nichols JJ. Human meibum and tear film derived (o-acyl)-omega-hydroxy fatty acids in meibomian gland dysfunction. *The Ocular Surface.* 2021; 21: 118-128.
- Khanal S**, Bai Y, Ngo W, Wilson L, Barnes S, Nichols KK, Nichols JJ. Human meibum and tear film derived (o-acyl)-omega-hydroxy fatty acids as biomarkers of tear film dynamics in meibomian gland dysfunction and dry eye disease. *Invest Ophthalmol Vis Sci.* 2021;62(9):13
- Khanal S**, Paudel N, Joshi MR. Optometry in Nepal: historical perspectives. *Clinical and Experimental Optometry.* 2021 May 2:1-4.
- Bai Y, Ngo W, **Khanal S**, Nichols KK, Nichols JJ. Human precorneal tear film and lipid layer dynamics in meibomian gland dysfunction. *The Ocular Surface.* 2021 Mar 23:S1542-0124(21)00018-5.
- Turnbull P, **Khanal S**, Dakin S. The effect of cellphone position on driving and gaze behavior. *Scientific reports.* 2021 Apr 8;11(1):1-0.
- 2020 **Khanal S**, Rathod SN, Phillips JR. The acute effect of atropine eye drops on the human full-field electroretinogram. *Doc Ophthalmol.* 2021 Jun;142(3):315-328. Epub 2020.
- Kharal A, **Khanal S (co-first author)**, Shrestha JB, Shrestha GS, Paudel N. Flash VEP in clinically stable pre-term and full-term infants. *Doc Ophthalmol.* 2020 June 6.
- 2019 **Khanal S**, Phillips JR. Which low-dose atropine for myopia control? *Clinical and Experimental Optometry.* 2019; 103: 230-232.
- Khanal S**, Turnbull PRK, Lee N, Phillips JR. Effect of atropine on global flash mfERG responses to retinal defocus. *Invest Ophthalmol Vis Sci.* 2019;1(60):218-225.
- Khanal S**, Turnbull PRK, Vaghefi E, Phillips JR. Repeatability of arterial spin labeling MRI in measuring blood perfusion in the human eye. *JMRI.* 2019 Apr;49(4):966-74.
- 2017 Uprety S, Morjaria P, Shrestha JB, Shrestha GS, **Khanal S**. Refractive status in preterm infants and its relation to clinical risk factors. *Optom Vis Sci.* 2017 Oct 1;94(10):957-64.
- Khanal S**, Walton M, Davey PG. Evaluation of intraocular pressure estimates obtained using an ICare rebound tonometer. *Clin Exp Optom.* 2017;100(2):179-83.
- Gnyawali S, Shrestha GS, **Khanal S**, Dennis T, Spencer JC. Ocular morbidity among porters at high altitudes. *Nepal J Ophthalmol.* 2017 Jun 20;9(1):30-6.

- Sitaula RK, Joshi SN, **Khanal S**. Surgical eye camp in a rural area of Nepal and its role in Vision 2020. Journal of Chitwan Medical College. 2017;6(2):1-5.
- Thapa M, Gautam P, Joshi SN, **Khanal S**. Antibiotic sensitivity pattern on cluster endophthalmitis caused by Gram-negative organism JIOM. 2017;39(2): 38-42.
- 2016 **Khanal S**, Davey PG, Racette L, Thapa M. Comparison of retinal nerve fiber layer and macular thickness for discriminating Primary Open Angle Glaucoma and Normal-Tension Glaucoma using Optical Coherence Tomography. Clin Exp Optom. 2016;99(4):373-81.
- Uprety S, **Khanal S**, Morjaria P, Puri LR. Profile of Pediatric Low Vision Population: A Retrospective Study from Nepal. Clin Exp Optom. 2016;99(1):61-5.
- Khanal S**, Davey PG, Racette L, Thapa M. Intraeye retinal nerve fiber layer and macular thickness asymmetry measurements for the detection of Primary Open Angle Glaucoma and Normal-Tension Glaucoma using OCT. J Optom. 2016;9:118-25.
- Khanal S**, Pokharel A, Kandel H. Visual deficits in Nepalese patients with oculocutaneous albinism. J Optom. 2016;9:102-9.
- 2014 **Khanal S**, Thapa M, Racette L, Johnson R, Davey PG, Joshi MR, Shrestha GS. Retinal nerve fiber layer thickness measurements in glaucomatous Nepalese eyes and their relation with visual field sensitivity. J. Optom. 2014;7:217-224.
- Khanal S**, Kandel H. Axial length and corneal curvature in anisometric amblyopia in Nepalese children. Opt Vis Perf 2014;2(3):142-145.
- Thapa M, **Khanal S**, Shrestha GB, Sharma AK. Retinal nerve fiber layer thickness measurement in Nepalese population by optical coherence tomography. Nepal J Ophthalmol 2014;6(12):131-139.
- 2013 **Khanal S**, Lama P. Profile of low vision population attending low vision clinic in a peripheral eye hospital in Nepal. Opt Vis Perf 2013;1(6):367-376.
- Khanal S**, Gautam P, Paudel N. Waardenburg syndrome: A report of two familial case series. Opt Vis Perf 2013;1(6):378-385.
- Thapa M, Kumar P, **Khanal S**, Shrestha GB, Sharma AK. Unusual case of bilateral angle closure glaucoma. J Nepal Med Assoc 2013;52 (190):205-12.
- Thapa M, Shrestha GB, Sharma AK, Karki S, **Khanal S**. Recurrence of uveal malignant melanoma: a case report. Nepal J Ophthalmol 2013;5(10):275-278.

### ***Editor-reviewed articles***

- 2021 **Khanal S**. Myopia Management: A Specialty or Primary Care? Mastering Myopia, Contact Lens Spectrum. July 21, 2021.
- Khanal S**. Ocular Growth Charts: A New Decision-Making Tool For Myopia Management. Mastering Myopia, Contact Lens Spectrum. June 23, 2021.
- 2020 **Khanal S**. Evidence-based Myopia Management: Clinical Considerations. MiVision. December 2020. (Continuing Professional Development Article)
- Khanal S**. 0.01% Atropine's puzzling disconnect. MiVision. February 2020.
- Khanal S**. Which low-dose atropine for myopia control? NZOptics. March 2020.
- Khanal S**. Optometry from New Zealand to Nepal. NZAO TVC. February 2020.

- 2017 **Khanal S**, Turnbull PRK. Atropine: Efficacy and possible mechanisms for myopia control. MiVision. November 2017.
- 2015 **Khanal S**. Impact of Visual Skills Training on Sports Performance: Current and Future Perspectives. *Adv Ophthalmol Vis Syst* 2015, 2(1):00032.
- 2012 **Khanal S**. Spectral Domain Optical Coherence Tomography in Glaucoma: A review of its interpretation. *Annual Optometry Journal- The Sight*. 2012;8(8):56-59.  
Kandel H, **Khanal S**, Pokharel A, Bhatta S. Pattern of ocular morbidity in a rural community of Nepal. *Annual Optometry Journal- The Sight*. 2012;8(8):18-19.
- 2011 **Khanal S**. Visual Motor Integration and Learning Disabilities: The Role of Optometrists. *Annual Optometry Journal- The Sight*. 2011;7(7):54-55.

## Research Activity

---

### *Refereed Conference Presentations*

- 2021 **Khanal S**, Gamble K, Norton TT, Gawne TJ The spectrum of ambient light does not substantially affect circadian rhythms of behavioral activity in tree shrews (Accepted for paper presentation at the American Academy of Optometry Annual Meeting 2021).  
**Khanal S**, Bai B, Ngo W, Wilson L, Barnes S, Nichols KK, Nichols JJ. Human Meibum and Tear Film Derived (O-acyl)-Omega-Hydroxy Fatty Acids as Biomarkers of Tear Film Dynamics. ARVO 2021 (Paper)
- 2020 **Khanal S**, Norton TT, Gawne TJ. Amber light treatment produces hyperopia in tree shrews. Southeastern Vision Research Conference, 7–8 December 2020, USA.  
**Khanal S**, Norton TT, Gawne TJ. Amber light treatment produces hyperopia in tree shrews. AAO, 7–22 November 2020, Nashville, TN, USA.  
**Khanal S**, Norton TT, Gawne T. 7-MX does not prevent induced myopia in tree shrews. ARVO 2020.
- 2019 Kharal A, **Khanal S**, Shrestha GS, Shrestha JB, Paudel N. Comparison of Flash VEP between Clinically Stable Preterm and Full Term Infants. AAO, 23–27 October 2019, Orlando, FL, USA.  
Rathod S, **Khanal S**, Phillips J. The effect of 0.1% Atropine on human full-field electroretinogram responses. 17<sup>th</sup> IMC, 12–15 September 2019, Tokyo, Japan.  
**Khanal S**, Turnbull PRK, Vaghefi E, Phillips JR. Blood perfusion MRI response of the human choroid to myopic retinal image defocus. ARVO 2019, Vancouver, Canada.
- 2018 **Khanal S**, Kim L, Turnbull PRK, Phillips JR. The effect of temperature on the thickness of the ocular choroid. AAO, 7–10 November 2018, San Antonio, USA.  
**Khanal S**, Turnbull PRK, Lee Nicholas, Phillips JR. Effect of atropine on multifocal electroretinogram responses to defocus. 56<sup>th</sup> ISCEV symposium, 20-23 June 2018, Reims, France (Paper).  
**Khanal S**, Turnbull PRK, Lee Nicholas, Phillips JR. Atropine selectively enhances peripheral mfERG responses to myopic retinal defocus. SEMO, 5–6 April, Australia (Paper).
- 2017 **Khanal S**, Turnbull PRK, Vaghefi E, Phillips JR. Intra- and inter-session reproducibility of MRI measures of blood perfusion in the human choroid. 16<sup>th</sup> International Myopia Conference, 14–17 September 2017, Birmingham, UK.
- 2016 **Khanal S**, Turnbull PRK, Phillips JR. Defocus induced changes in retinal electrophysiological responses and the effect of atropine. AAO, 9–12 November 2016, Anaheim, CA, USA.  
Khanal S, Turnbull PRK, Vaghefi E, Phillips J. Arterial spin labeling for ischemic retinal diseases. HealthX, The University of Auckland, 9 September 2016, Auckland, New Zealand.

- 2015 **Khanal S**, Pokharel A, Kandel H. Visual Problems in Albinism. 20<sup>th</sup> APOC, 9–11 October 2015, Kuala Lumpur, Malaysia.  
**Khanal S**, Davey PG, Racette L, Thapa M. Intraeye RNFL and macular thickness asymmetry for the discrimination of NTG and POAG. 20<sup>th</sup> APOC, 9–11 Oct 2015, KL, Malaysia (Paper).  
**Khanal S**, Davey PG, Racette L, Thapa M. Comparison of RNFL and macular thickness parameters for discrimination of POAG and NTG. 1<sup>st</sup> WCO Congress, 14–16 August 2015, Medellin, Colombia (Paper).
- 2014 **Khanal S**, Lama P. Profile of low vision population attending a low vision clinic in Nepal. 1<sup>st</sup> CEU International Conference of Health Professionals, 31 Jan Manila, Philippines (Paper).  
**Khanal S**, Gautam P, Paudel N. Waardenburg syndrome- A case report of two familial case series. 1<sup>st</sup> CEU International Conference of Health Professionals, 31 January 2014, Manila, Philippines (Paper).
- 2013 Kandel H, Kaphle D, Gyawali R, **Khanal S**, Upadhyaya S. Refractive errors in the Maldives- A pilot study. 19<sup>th</sup> APOC, 2–4 October 2013, Seoul, Korea.

### ***Invited presentations (fully funded)***

- 2021 “The mechanistic basis of myopia: Insights from defocus and chromatic cues”, New England College of Optometry, 26 April 2021, Boston, MA, USA.
- 2019 “The mechanistic basis of myopia: Insights from physiology”, the University of Alabama at Birmingham School of Optometry, 23 April 2018, AL, USA.
- 2018 “MRI of blood flow in the human retina/choroid complex”, 1<sup>st</sup> All Nepal Optometry Conference, 5–6 October 2018, Nepalese Association of Optometrists, Kathmandu, Nepal
- 2017 “MRI for the measurement of blood flow in the human eye”, 87<sup>th</sup> New Zealand Association of Optometrists Conference, 13–14 October 2017, Hamilton, New Zealand

### ***Other presentations***

- 2019 “Which low-dose atropine for myopia control”, School of Optometry and Vision Science Conference, 16 June 2019, Auckland, New Zealand.
- 2018 “Quantifying chorio-retinal perfusion using arterial spin labeling MRI. Division of Optometry and Vision Science, City, University of London, 14 June 2018, London, UK.  
“Arterial spin labeling MRI in Ophthalmology”, Institute of Biomedical Engineering, University of Oxford, 8 June 2018, Oxford, UK.  
“Global flash mfERG for myopia”, Roland Consult Electrophysiology Users Meeting, Department of Ophthalmology, Greenlane Hospital, 13 May 2018, Auckland, New Zealand.
- 2017 “Atropine’s action to control myopia: Understanding the mechanisms”, School of Optometry and Vision Science Conference, 29 May 2017, Auckland, New Zealand.

### **Collaborative Research Visits**

---

- 2018 Prof. Michael Chappell, Institute of Biomedical Engineering, University of Oxford, UK  
2018 Prof. Nicola Logan, School of Optometry, Aston University, Birmingham, UK

### **Research Support**

---

- 2021 (pending) Combining optical and chromatic methods for the treatment of childhood myopia. CooperVision Science and Technology Award. US\$400,000. Role: PI

- 2019 'Myopia control spectacle lens design and choroidal thickness' PI: J. Phillips. Funder: Essilor R&D, Singapore. NZ\$85,000, Role: Co-investigator
- 2017–2018 'Effect of complex defocus on the multifocal electroretinogram (mfERG) in normal and myopic eyes' PI: J. Phillips. Funder: CooperVision Inc. US\$100,000, Role: Co-investigator
- 2018 University of Auckland Centre for Brain Research Knowledge Exchange Grant to Safal Khanal for collaboration with the University of Oxford and Aston University. NZ\$5000.

### **Ad-hoc Journal Peer Reviewer**

---

Experimental Eye Research, Investigative Ophthalmology and Visual Science, Optometry & Vision Science, Ophthalmic & Physiological Optics, Current Eye Research, Eye and Contact Lens, Contact Lens and Anterior Eye, Cortex, Documenta Ophthalmologica, Clinical and Experimental Optometry, BMC Ophthalmology, Journal of Optometry, Optometry and Visual Performance

### **Ad-hoc Grant Reviewer**

---

Grants in Preparation (UAB Comprehensive Neuroscience Centre)

### **Research Supervision**

---

- 2019 Cassandra Ang, Kriti Rana, Kamaldeep Kaur, Jin Aidi (Part V Research Co-supervisor)
- 2019 Mark James, Dae Hyun Jin, Cindy Cheakhun, Anthony Chin (Part IV Research Co-supervisor)
- 2019 Alah Musa, Lusi Yu, Saagar Patel, Sahil Suratwala (Part IV Research Co-supervisor)
- 2018–2019 Sachi Rathod and Joy Qin (Summer Research Co-supervisor)
- 2018 Sasha Logan and Olivia Wood-Bodley (Part V Research Co-supervisor)
- 2017–2018 Lucia Kim (Summer Research Co-supervisor)
- 2016–2017 Nicholas Lee (Summer Research Co-supervisor)

### **Teaching Experiences**

---

- 2021 VIS 779: Advanced Graduate Seminar in Interdisciplinary Studies
- 2018 OPTOM 430B: Contact lens Practice
- 2018–2019 OPTOM 416: Clinical Optometry
- 2016–2019 OPTOM 316: Optometry
- 2016–2017 OPTOM 272: Structure and Function of the Visual System  
MEDSCI 316: Sensory Neuroscience: From Molecules to Disease

### **Professional Affiliations and Positions**

---

- 2020 International Myopia Institute White Paper Task Force Member
- 2020– Editor-in-Chief, Mero Eye Journal
- 2018–2020 Member, Cornea and Contact Lens Society of New Zealand
- 2018– Member, Association for Research in Vision and Ophthalmology
- 2018 Member, International Society for Magnetic Resonance in Medicine (ISMRM)
- 2018 Scientific Committee Member, 1<sup>st</sup> All Nepal Optometry Conference
- 2018–2019 Grant Officer and Faculty Research Committee, FMHS-PGSA
- 2018–2020 Member, International Sports Vision Association

2017–2019	Member, Australasian College of Behavioural Optometrists
2017	Co-chair, Abstract Review Committee, HealthX, The University of Auckland
2017	Health, Safety and Wellbeing Committee, Campus Life, The University of Auckland
2015–2017	Board member, Postgraduate Students' Association, The University of Auckland
2015–2019	Board member, FMHS- Postgraduate Students' Association
2016–2017	Member, University of Auckland Human Participants Ethics Committee
2012–	Member, Nepalese Association of Optometrists (NAO)
2015–	Member, Nepal Health Professional Council
2014–	Member, International Society for Clinical Electrophysiology of Vision (ISCEV)
2012–2016	Member, College of Optometrists in Vision Development (COVD)
2010–2012	Editor, Annual Optometry Journal - The Sight, Eds. 6 and 8, and Annual Report, BPKLCOS
2010–2011	Secretary, Nepal Optometry Students' Society (NOSS)

## Scholarships and Awards

---

2021	Association of Research in Vision and Ophthalmology Travel Grant
2019	NZAO Higher Degree Research Write Up Scholarship (NZ\$3600)
2018	Eberhard Dodt Memorial Award (€3000)
2018	UniServices Ph.D. category Winner, Velocity Innovation Challenge 2018 (NZ\$1000)
2018	Centre for Brain Research Knowledge Exchange Grant (NZ\$5000)
2018	International Society for Clinical Electrophysiology of Vision Travel Grant (US\$1200)
2018	Scientific and Educators' Meeting in Optometry Travel Grant (A\$650)
2018	American Academy of Optometry Travel Fellowship (US\$750)
2017	FMHS Postgraduate Student Association Travel Grant (NZ\$500)
2016	American Academy of Optometry Travel Fellowship (US\$750)
2015	Asia Pacific Optometric Congress Travel Grant (US\$800)
2015	University of Auckland Ph.D. Scholarship
2015	CARIPARO Ph.D. Scholarship (Not taken)
2015	WCO Travel Grant for First World Congress of Optometry (US\$2500)
2015	Best English paper, First World Congress of Optometry, Colombia
2015	Lt-Col Henry Kirkpatrick Scholarship (Not taken)
2014	Top-notch and Dean's Lister, Doctor of Optometry, Philippines

## Courses/Certifications

---

2020	Institutional Review Board training, Good Clinical Practice, Responsible Conduct of Research, University of Alabama at Birmingham
2020	Euclid Emerald Certification for Orthokeratology Lenses
2020	Bausch + Lomb Vision Shaping Treatment VST Process Design Certification Program
2019	Applying electrophysiological techniques to translational vision research, ARVO, Canada
2018	Human Lab Course on Electrophysiology, ISCEV symposium, Reims, France
2017	Managing Myopia Course, Brien Holden Vision Institute Academy, Sydney, Australia
2016	UT.7.20x: Foundations of Data Analysis, University of Texas, USA
2015	Global Blindness: Planning and Managing Eye Care Services, LSHTM, London, UK.

## Programming/Statistical Software

---

MATLAB, R, Git, Github, SPM, FSL, MetaboAnalyst, GraphPad Prism, SPSS, Microsoft Office, SigmaPlot