GRADUATE FACULTY

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Professor
PhD: University of Michigan

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PhD: OSU

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BOptom: University of Auckland
PhD: University of Auckland

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Professor of Clinical Optometry
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Associate Professor
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PhD: University of Durham

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OD, MS: University of Waterloo
PhD: Dalhousie University

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Research Assistant Professor
OD, PhD: University of Houston

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Marjean T. Kulp
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OD, MS: OSU

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PhD: University of Chicago

Jun Liu
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PhD: OSU

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PhD: University of Alabama, Birmingham

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Dean VanNasdale
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PhD: Indiana University

Heidi Wagner
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MPH: University of Massachusetts Amherst

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OD: UC Berkeley
MS, PhD: OSU

Deyue (Dion) Yu
Associate Professor
MS: Nankai University
PhD: University of Minnesota

Karla Zadnik
Dean
OD, PhD: UC Berkeley

Aaron B. Zimmerman
Professor of Clinical Optometry
OD, MS: OSU

Dr. Melissa Bailey's laboratory, Lab4Eyes (u.osu.edu/bailey.352), is devoted to helping children and adults see better and read better. Dr. Bailey has an active research program, studying ciliary muscle development and how it relates to myopia, accommodative function, and academic achievement. She is also working to develop and commercialize new devices that will allow healthcare providers to make more accurate eye measurements and improve access to vision care for patients around the world.

Dr. Angela Brown studies color vision and infant visual development. She collaborates with Dr. Delwin Lindsey in a study of the perception and naming of colors by the Somali people who live in Columbus Ohio. Recently, Dr. Brown was the first person ever to measure the contrast sensitivity of newborn and premature infants, and she is working to develop her visual acuity and contrast sensitivity test for use in clinical infant vision testing worldwide.

Dr. Colleen Cebulla's research interests include translational research on retinal disease with a focus on the role of inflammation. Her work aims to identify mechanisms of retinal cell death and gliosis due to retinal detachment, macular degeneration, and other diseases that lead to visual loss. Her work also focuses on gene polymorphisms that may predispose individuals to disease and serve as biomarkers. The ultimate goal is to translate these findings to improved therapies for patients.

While **Dr. Heather Chandler's** primary research focus examines the mechanisms by which cataracts and secondary cataracts form, there are several ongoing projects in her laboratory that pertain to protein regulation in the cornea. Research opportunities include: reducing secondary cataract formation through surgical or pharmacologic intervention and improving corneal wound healing. While Dr. Chandler's research is laboratory-based, the overall goal of her lab is to take bench research findings and clinically apply them to the chairside.

Dr. Stacey Choi's research interest is the application of adaptive optics (AO) retinal imaging systems to enhance understanding of disease mechanisms of retinal and optic nerve diseases. The AO technology allows us to visualize cellular structures in the retina and optic nerve head in living eyes. We are particularly interested in identifying early biomarkers of these diseases from our in-vivo images and functional tests for earlier diagnosis, hence leading to better prognosis for the patients.

Dr. Jackie Davis' research interest is issues that impact the visual health of communities. She is currently working with a high school, assisting academically challenged students to receive comprehensive vision exams and glasses when needed. Those students needing correction will be offered the opportunity to be refit with contact lenses. Our project will investigate if those students will experience any changes in their self-perception and/or academic performance following this visual health intervention.

Dr. Nathan Doble's research interest is the design, construction and use of high resolution retinal imaging systems to study the structure and function of the human eye. This is achieved through the use of adaptive optics to

overcome the ocular aberration allowing for the ability to observe single cells in-vivo. The overall aim is to use cell based measurements of retinal health to predict disease at a much earlier stage than is currently possible clinically.

Dr. Bradley Dougherty conducts research to better our understanding of the impact of vision impairment and to evaluate rehabilitation approaches for patients with low vision. He is currently conducting a study in collaboration with the Department of Ophthalmology of the relationships among stress and depression, inflammation, and treatment outcomes in patients with age-related macular degeneration. Another research focus is road safety in drivers with low vision who use bioptic telescopic spectacles.

Dr. Andrew Fischer's research interests are centered on understanding the molecular and cell signaling pathways that influence the ability of support cells in the retina, the Müller glia, to be reprogrammed into stem cells with the capacity to regenerate neurons. Long-term goals are to determine the precise mechanisms that enhance the neurogenic and regenerative potential of Müller glia-derived progenitor cells to develop novel therapies to treat degenerative diseases of the retina.

In **Dr. Nick Fogt's** laboratory, eye movements and head movements are monitored with a variety of devices. The eye movement studies are focused in two main areas. The first area of study involves eye and head coordination in sports. The second area of study looks at the neural pathways involved in coordination of the two eyes. Problems with eye movement coordination between the two eyes are common clinically.

Signals travel from the eye to the brain via retinal ganglion cells (RGCs), and the anatomy and physiology of these neurons are the focus **Dr. Andy Hartwick's** research investigations. He is particularly interested in studying the function of a subset of RGCs that capture light and directly convert it into an electrical signal. In addition, he directs clinical studies that examine the effect of conditions such as glaucoma and traumatic brain injury on RGC photoreception.

Dr. Juan (Jenny) Huang's research focuses on investigating whether adding 0.01% low concentration atropine to soft bifocal contact lens wear will result in a greater effect of slowing myopia progression than administering soft bifocal contact lenses alone in children. Another research interest in her laboratory is to evaluate the relationship between short-term changes in choroidal thickness and long-term regulation of myopia progression and ocular growth.

Dr. Lisa Jones-Jordan is responsible for the data coordinating center for the Bifocals In Nearsighted Kids (BLINK) Study. She is responsible for the data collected during the study, as well as the statistical analyses that result from this clinical trial. In addition, she manages the data collection of smaller contact lens and Meibomian gland dysfunction studies.

Dr. Marjean Kulp's research interests lie in the areas of pediatrics, binocular vision, and refractive error. Her research experience includes serving as a Principal Investigator of the Vision in Preschoolers-Hyperopia in Preschoolers Study and as principal investigator of the OSU College of Optometry clinical center for the Convergence Insufficiency Treatment Trial studies, Pediatric Eye Disease Investigator Group Studies (e.g. Amblyopia Treatment Studies), Vision in Preschoolers study, and pirenzepine for myopia control.

Dr. Delwin Lindsey studies human color vision. His current work focuses on the study of color perception and categorization within and between cultures. These studies make extensive use of a large Somali immigrant population living in Columbus, OH. Cross-cultural comparisons of color perception and categorization are important because they provide a powerful model for testing hypotheses about how cultural and innate sensory processes influence how humans perceive and think about their world

Ms. Lynn Mitchell serves as Director of the Data Coordinating Center for research studies in binocular vision (Convergence Insufficiency Treatment Trial – Attention and Reading Trial) and contact lenses (Contact Lens Assessment in Youth). In addition, Ms. Mitchell serves as a collaborator for studies in accommodative dysfunction, myopia, and vision testing for children with Autism Spectrum Disorder. She also collaborates with ophthalmic researchers within the college and outside OSU in the areas of study design and analysis.

The focus of **Dr. Don Mutti's** research is to understand the optical and structural development of the eye in order to learn the causes of refractive errors like myopia and hyperopia. The aims of current projects are to explore the basis of the beneficial effects of time outdoors on myopia, understand risk factors for myopia progression, evaluate the effectiveness of treatments to slow myopia progression, and how best to address hyperopia in infants and children.

Dr. Teng Leng Ooi uses psychophysical methods to study how surface, contour and top-down processing influence the sensorimotor mechanisms of stereopsis, binocular rivalry and space perception. The knowledge gained is used to advance clinical care of low and binocular vision. An ongoing research seeks to reduce eye-dominance and improve stereopsis in adult amblyopes and people with vocational needs using a Push-Pull vision training protocol that capitalizes on basic understanding of cortical plasticity and inhibitory-and-excitatory balance.

A major goal of **Dr. Timothy (TJ) Plageman's** research is to elucidate how embryonic eye tissues shape themselves during development at a cellular and molecular level and how disruptions in these mechanisms lead to ocular malformations. To accomplish this goal, embryonic development of the eye is studied in both the mouse and chicken model systems and a variety of techniques are utilized that include live fluorescence microscopy, histology, and molecular biology.

Dr. Tom Raasch's research activities concentrate on issues in low vision, visual performance, and visual optics. He uses various techniques to evaluate the optical and visual characteristics of the eye, and novel techniques to design and correct optical defects of the eye. Interests also include the design, fabrication, and measurement of freeform optical systems, such as progressive addition lenses.

Dr. Dean VanNasdale's primary research focus is advanced retinal imaging, with an emphasis on normal aging changes and pathological changes associated with diabetic retinopathy and age-related macular degeneration. Changes to the normally well-ordered retinal structure can be highlighted by emphasizing specific light/tissue interactions. The goal of the lab is to distinguish normal aging changes from sight-threatening pathology and detect retinal damage earlier in the disease process using both commercially available and laboratory-based instruments.

As a founding member of the Contact Lens Assessment in Youth Study Group, **Dr. Heidi Wagner's** research focused on determining whether youth is an independent risk factor for contact lens complications, and has since expanded toward understanding risk factors associated with adverse contact lens events in both children and adults to promote healthy contact lens wear for all ages.

Research in **Dr. Jeffrey Walline's** laboratory focuses on clinical questions in the area of pediatric contact lenses and refractive error. Past research includes comparison of contact lens wear between children and teenagers, attempts to slow myopia progression with alignment-fitted gas permeable contact lenses, children's perceptions of other children wearing glasses, and the effects of contact lens wear on children's self-perceptions. Current research focuses on slowing myopia progression with soft bifocal contact lenses.

Dr. Deyue (Dion) Yu's research focuses on visual perception, perceptual learning, and their neural basis in normal and low vision. Research goals include investigating essential causes of the limitations faced by visually-impaired people, understanding the mechanisms underlying the behavioral and neural changes resulting from learning and visual impairment, developing efficient methods to obtain comprehensive assessment of functional vision, and establishing a general framework to guide the development of visual diagnostics and rehabilitation programs for visual disorders.

Dr. Aaron Zimmerman's research interests involve sports vision and adverse events with contact lens wear. The majority of the sports vision research has been conducted using eye and head movement recording devices and assessing how those coordinate with each other while trying to intercept a baseball. At Ohio State we have an excellent patient population for studying adverse events related to contact lens wear. We are continuing to perform studies evaluating corneal conditions.