

Brad Fortune

Senior Scientist

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Education

Cornell University, Ithaca, NY	B.S.	1987	Biology / Neurobiology
SUNY College of Optometry, New York, NY	O.D.	1991	Optometry
University of California, Berkeley, CA	Ph.D.	1998	Vision Sciences

Post-doctoral Training

July 1991 - June 1992	Resident in Optometry, V.A. Medical Center, San Francisco, CA
Feb 1999 - Jan 2001	Post-Doctoral Research Fellow, Discoveries in Sight, Portland, OR

Employment / Faculty Positions

July 1992 - Aug 1992	Staff Optometrist, V.A. Medical Center, San Francisco, CA
Aug 1992 - July 1996	Clinical Instructor, School of Optometry, University of California, Berkeley, CA
July 1996 - Dec 1998	Assistant Clinical Professor, School of Optometry, University of California, Berkeley, CA
Feb 2001 - Oct 2004	Assistant Scientist, Legacy Health System, Portland, OR
Jan 2002 – present	Clinical Instructor, Dept. of Ophthalmology, School of Medicine, Oregon Health & Science University, Portland, OR
Jan 2002 – present	Director, Clinical Electrodiagnostics Service, Devers Eye Institute, Legacy Health, Portland, OR
Oct 2004 – present	Associate Scientist, Legacy Health, Portland, OR
Oct 2014 – present	Adjunct Professor, Department of Integrative Physiology & Neuroscience, Washington State University, Pullman/Vancouver, WA
June 2020 – present	Senior Scientist, Legacy Health, Portland, OR

Professional Licensure

Oregon Optometry 2824AT (2001 to present)
California Optometry 9833 (1991 to present)

Professional Affiliations

Association for Research in Vision and Ophthalmology (ARVO, Silver Fellow 2016, Gold Fellow 2019)
International Society for Clinical Electrophysiology of Vision (ISCEV, 2000-present)
American Academy of Optometry (1991-present; Fellow, 1999-present)
Optometric Glaucoma Society (OGS, Founding Member 2002-present)
Association of International Glaucoma Societies / World Glaucoma Association (2005-present)
International Perimetric Society (IPS) & North American Perimetric Society (NAPS, 2001-present)
Glaucoma Progression Scholars (Invited Member, Steering Committee, 2008-present)
International Society for Eye Research (2010-present)

Editorial Boards

2018 – present	Member, Editorial Board, <i>Investigative Ophthalmology & Visual Science</i>
2016 – present	Member, Editorial Board, <i>Journal of Glaucoma</i>
2007 – 2008	Guest Editor, Feature Issue on Glaucoma, <i>Optometry and Vision Science</i>
2005 – 2010	Associate Editor, Optometric Glaucoma Society Quarterly E-Journal

Invited Referee for Peer-Reviewed Archival Journals

Acta Ophthalmologica; American Journal of Ophthalmology; Archives of Ophthalmology; Biomedical Optics Express; British Journal of Ophthalmology; BMC Ophthalmology; Clinical and Experimental Ophthalmology; Current Eye Research; Disease Models & Mechanisms; Documenta Ophthalmologica; European Journal of Ophthalmology; Experimental Eye Research; Expert Review of Ophthalmology; BMC Eye and Vision; Graefe's Archive for Clinical and Experimental Ophthalmology; Investigative Ophthalmology and Visual Science; Journal of the American Heart Association; Journal of Biomedical Optics; Journal of Glaucoma; Journal of Vision; Neurology; Neuroscience; Ophthalmic and Physiological Optics; Ophthalmic Surgery, Lasers and Imaging Retina; Ophthalmology; Ophthalmology–Glaucoma; Optometry and Vision Science; Physiological Measurement; PLoS One; Progress in Retinal and Eye Research; Retina; Scientific Reports; Translational Vision Science & Technology; Vision Research; Visual Neuroscience

Awards / Honors

Thomas R. Lee Award for Glaucoma Research, BrightFocus Foundation, 2017
Optometric Glaucoma Society (OGS) President's Lecture, 2012
Irvin and Beatrice Borish Award, American Academy of Optometry, 2004
Founding Member, Optometric Glaucoma Society, 2002
Junior Investigator Award, International Society for Clinical Electrophysiology of Vision, 2000
William C. Ezell Fellowship, American Optometric Foundation, 1997 & 1998
Beta Sigma Kappa Optometric Honor Society, 1990-present

Grant Review Panels

2020 July	Reviewer, Grant Applications for “AOA Investigator Initiated Research Award,” American Optometric Association Council on Research
2020 June	Member (Ad-hoc), Study Section: “NEI Secondary Data Analysis (R21) Applications; ZEY1 VSN (02)””; National Eye Institute, Center for Scientific Review; NIH
2019 November	Member (Ad-hoc), Study Section: “NEI Genetic Epidemiology and Secondary Data Analysis; 2020/01 ZEY1 VSN (02)””; National Eye Institute, Center for Scientific Review; NIH
2019 – present	Member, Scientific Review Committee, National Glaucoma Research program, BrightFocus Foundation, Clarksburg, MD
2019 – present	Member, Shaffer Grant Advisory Committee, Glaucoma Research Foundation, San Francisco, CA
2019 August	Reviewer (Ad-hoc), Allergan Foundation Research Grant Applications; American Academy of Optometry Foundation.
2019 March	Member (Ad-hoc), Study Section: “Emerging Imaging Technologies in Neuroscience; ZRG1 EITN-L (08)””, Division of Neuroscience, Development, and Aging; Center for Scientific Review; NIH
2017 December	Member (Ad-hoc), Special Emphasis Panel: “Clinical Trial Readiness for Rare Neurological and Neuromuscular Diseases, ZNS1 SRB-A(14)””, National Institute of Neurological Disorders & Stroke (NINDS), Center for Scientific Review; NIH
2017 June	Member (Ad-hoc), Diseases and Pathophysiology of the Visual System (DPVS) Study Section, Center for Scientific Review; NIH
2016 January	Member (Ad-hoc), Study Section Special Emphasis Panel ZRG1 SBIB-Z (55), Center for Scientific Review, NIH
2014 October	Member (Ad-hoc), Diseases and Pathophysiology of the Visual System (DPVS) Study Section, Center for Scientific Review (CSR); NIH
2012 December	Member (Ad-hoc), Study Section (Panel/SRG 2013-01 ZGM1 TWD-7); National Institute of General Medical Sciences Special Emphasis Panel Center for Scientific Review, NIH
2012 – present	Reviewer (Ad-hoc), International Glaucoma Association Research Awards; The Royal College of Ophthalmologists & College of Optometrists, UK
2011 February	Member (Ad-hoc), National Glaucoma Research committee; American Health Assistance Foundation (AHAF)
2010 October	Member (Ad-hoc), Special Emphasis Panel ZRG1 CBC 90, Biology and Diseases of the Posterior Eye (BDPE) Study Section; Center for Scientific Review, NIH
2010 February	Member (Ad-hoc), Biology and Diseases of the Posterior Eye (BDPE) Study Section; Center for Scientific Review, NIH

Other Experience / Service to Professional Organizations

2020 February	Invited Participant, “Understanding Human Retina Biology and Perception Workshop”; The National Eye Institute Audacious Goals Initiative for Regenerative Medicine, NIH-NEI, Bethesda, MD
2017 February	“Advocacy Day” on Capitol Hill, Washington D.C., represented ARVO and the National Alliance for Eye and Vision Research (NAEVR) while meeting with staff members of U.S. Senators Ron Wyden (D-OR) and Jeff Merkley (D-OR).
2014 – 2017	Member (Elected) and Chair 2016-2017, Annual Meeting Program Committee, Glaucoma Section, Association for Research in Vision and Ophthalmology
2013 – present	Member (Chair, November 2016-present), IACUC, Legacy Health, Portland, OR
2013 – present	Member, Program Committee, ARVO-ISIE Imaging in the Eye Conference (International Society for Imaging in the Eye), 11 th , 12 th , 13 th Annual
2013 – present	Member, Steering Committee, Glaucoma Progression Scholars
2012	Member, Search Committee; Chief of Ophthalmology, Devers Eye Institute, Legacy Health
2007 – 2009	Member, Basic Science Council, National Board of Examiners in Optometry Representative from Ocular/Visual Biology Committee
2004 – 2009	Member, (Chair, 2007/2008) Ocular/Visual Biology–Ocular Disease/Trauma Examination Development Committee, National Board of Examiners in Optometry
2008 – 2010	Chair, Program Committee, Optometric Glaucoma Society
2004 – 2007	Chair, Membership Mentoring Committee, Optometric Glaucoma Society
2002 – 2009	Member, Research Advisory Committee, Legacy Research Services, Legacy Health System, Portland, OR
2002 October	Primary Reviewer & <i>ad hoc</i> Member, Institutional Review Board (IRB), Legacy Health System, Portland, OR
2001 – 2006	Certified Central Reader, Data Quality and Endpoint Assessment, Central Reading Center, Portland, OR (Multicentered Memantine Trial, Allergan).
1994 – 2009	Examiner/Senior Examiner, National Board of Examiners in Optometry.
1993 – 1998	Instructor, CE Therapeutics Course, U.C. Berkeley School of Optometry.

Conference Session Moderator

2019 October	Session Moderator: “Structural Analysis in Glaucoma” Optometric Glaucoma Society 18 th Annual Scientific Meeting
2019 April	Session Moderator: “OCT - Clinical Applications II” Multidisciplinary Ophthalmic Imaging Cross-sectional Group, Association for Research in Vision and Ophthalmology (ARVO)

- 2018 May Session Moderator: “Capillaries, Blood Flow, OCT Angiography”
Glaucoma Section oral presentations,
Association for Research in Vision and Ophthalmology (ARVO)
- 2017 June Session Moderator and Chair: “Image Reading and Grading”
World Glaucoma Congress, Helsinki, Finland
- 2017 May Co-organizer of the Glaucoma Section Minisymposium:
“Optic Nerve Regeneration: Barriers Past and Future” for the
Association for Research in Vision and Ophthalmology (ARVO)
- 2016 April Session Moderator: “Glaucoma” Oral Presentations,
Imaging in the Eye Conference
Association for Research in Vision and Ophthalmology (ARVO)
- 2015 May Session Moderator: “Glaucoma Imaging.” Oral Presentations,
Association for Research in Vision and Ophthalmology (ARVO)
- 2015 May Session Moderator: “Glaucoma” Oral Presentations,
Imaging in the Eye Conference
Association for Research in Vision and Ophthalmology (ARVO)
- 2014 May Session Moderator: “Visual Fields and Visual Function.” Oral Presentations,
Association for Research in Vision and Ophthalmology (ARVO)
- 2014 May Session Moderator: “Glaucoma” Oral Presentations,
Imaging in the Eye Conference
Association for Research in Vision and Ophthalmology (ARVO)
- 2013 May Session Moderator: “Imaging Glaucoma” Oral Presentations,
Imaging in the Eye Conference
Association for Research in Vision and Ophthalmology (ARVO)
- 2003 May Session Moderator: “Glaucoma: Visual Function & Electrophysiology II”,
Association for Research in Vision and Ophthalmology (ARVO)
- 2001 December Session Moderator: “Glaucoma, Treatment, Electrophysiology”,
American Academy of Optometry Annual Meeting

Invited Lectures & Meeting Participation

- Sept 2019 Thorny Issues in Ophthalmology Conference, Devers Eye Institute, Portland, OR;
“When and How Does Electrodiagnostic Testing (ERG and VEP) Help with Diagnosis?”
- May 2019 Multidisciplinary Symposium on Ocular and Medical Imaging, Northwest Eye Surgeons,
Seattle, WA; *“OCT imaging for glaucoma: What's new and what might be on the more
distant horizon?”*
- March 2019 Pacific University College of Optometry, Forest Grove, OR; *“Pulling & Tugging on the
Retina: Mechanical Impact of Glaucoma beyond the Optic Nerve Head”*
- March 2019 World Glaucoma Congress, Melbourne, Australia;
*“Detecting Progression in Non-Human Primate Glaucoma”; And:
“Electrophysiology is the Best Assessment of Visual Function” (Debate Counterpoint)*

- Feb 2019 Glaucoma Progression Scholars Bi-annual Meeting, Miami, FL;
“Progression of optic nerve head rim and circumpapillary RNFL compared using OCT”
- Jan 2019 Moorfields International Glaucoma Symposium, London, UK;
“Pulling & Tugging on the Retina: Mechanical Impact of Glaucoma beyond the Optic Nerve Head”; And: *“New imaging - where do we go from here?”*
- June 2017 World Glaucoma Congress, Helsinki, Finland;
“Interpreting OCT in glaucoma diagnosis and progression.” (Session Chair); And:
“Advanced functional assessment of glaucoma: Update on ERG.”
- Oct 2016 American Academy of Ophthalmology Annual Meeting, ARVO Symposium, “Paradigm Change in Ocular Imaging”, Chicago, IL: *“Retinal nerve fiber layer and the axon.”*
- May 2015 Association for Research in Vision and Ophthalmology (ARVO) Animals in Research Committee Workshop: *“Eyes on vision: in vivo imaging of animals in vision research.”* Denver, CO. *“In Vivo Assessment of Retinal Ganglion Cell Axon Structure and Function in Rodents and Non-human Primates.”*
- March 2015 Oxyopia Seminar, Indiana University School of Optometry, Bloomington, IN: *“Imaging retinal ganglion cells, their axons and transport in experimental models of optic nerve injury: implications for clinical management of glaucoma and other optic neuropathies.”*
- March 2015 Lasker/IRRF Initiative on Astrocytes and Glaucomatous Neurodegeneration Meeting, Janelia Farm Research Campus, Howard Hughes Medical Institute, Ashburn, VA.
- May 2014 Association for Research in Vision and Ophthalmology (ARVO), Glaucoma Section Minisymposium: *“Mechanisms of Axonal Damage in Optic Nerve Disease.”* Orlando, FL. *“Imaging axonal transport and degeneration.”*
- May 2014 Special Interest Group meeting: *“Polarization-sensitive optical coherence tomography for retinal imaging: What needs to be done to transfer the technology from the laboratory to the clinic?”* ARVO, Orlando, FL: *“Early stage axonal cytoskeletal damage detected in vivo by polarization-sensitive imaging in experimental glaucoma.”*
- Dec 2013 3rd Optic Nerve Conference, Obergurgl, Austria.
“The effect of cytoskeletal changes on imaging.”
- Oct 2013 Ezell Research Symposium, American Academy of Optometry, Seattle, WA;
“Axonopathy in Glaucoma: Implications for Diagnosis and Clinical Management.”
- Sept 2013 Glaucoma Progression Scholars Meeting, Chapel Hill, NC;
“The effect of age on optic nerve axon counts, SDOCT scan quality and peripapillary retinal nerve fiber layer thickness measurements in rhesus monkeys.”
- July 2013 World Glaucoma Congress, Vancouver, B.C., Canada;
“Manifestations of axonopathy during early stages of experimental glaucoma.”
- July 2013 World Glaucoma Congress, Vancouver, B.C., Canada;
“Advances in functional assessments in experimental glaucoma models.”
- Mar 2013 Department of Anesthesiology & Perioperative Medicine Research Conference, Oregon Health & Science University, *“Assessment of Glaucomatous Axonopathy In Vivo.”*
- Oct 2012 President’s Lecture 2012, Optometric Glaucoma Society Annual Scientific Meeting; *“Clinical Tools for Assessment of Glaucomatous Axonopathy.”* Phoenix, AZ
- Sept 2012 University of Alabama at Birmingham, Department of Optometry; Clinical Visiting Scholars Program, *“Axonopathy in Glaucoma: Clinical Tools for Assessment of Glaucomatous Axonopathy.”*

- Jan 2012 Dept of Optometry & Vision Sciences, University of Melbourne, Melbourne, Australia.
“Axonopathy in Glaucoma: Insights from Experimental Models.”
- Sept 2011 Glaucoma Progression Scholars Meeting, Skaneateles, NY; *“Peripapillary Retinal Nerve Fiber Layer Thickness, Retardance and ERG Changes at Onset of Optic Nerve Head Surface Topography Change in Experimental Glaucoma.”*
- July 2011 World Glaucoma Congress, Paris, France; *“Electrophysiology and glaucoma diagnosis.”*
- June 2011 Physics in Biomedicine (PH 337/BI 410), Portland State University, Portland, OR.
“Imaging Structure and Function of the Eye.”
- Oct 2010 17th Annual Glaucoma Foundation Optic Nerve Rescue and Restoration Think Tank, NYC, NY.
- Sept 2010 34th Annual Devers Eye Institute Thorny Issues in Ophthalmology Conference:
“Axonopathy in Glaucoma: Imaging Structure and Function.” Portland, OR.
- July 2010 XIX Biennial Meeting of the International Society for Eye Research, Montreal, Canada:
“Visualization in vivo of retinal astrocytes, ganglion cells, axons and transport.”
- March 2010 Lasker/IRRF Initiative for Innovation in Vision Science Janelia Farm Research Campus, Howard Hughes Medical Institute, Ashburn, VA. The Role of Astrocytes and Other Glial Cells in Retinal Degeneration, including Glaucoma: *“Electroretinogram abnormalities in glaucoma that might reflect early optic nerve head astrocyte dysregulation.”*
- July 2009 World Glaucoma Congress, Boston, USA; *“Electrophysiology and glaucoma diagnosis.”*
- Jan 2009 Vision Science Research Seminar Series, School of Optometry, Univ. of Waterloo, Waterloo, Canada and Vision Science Research Program, Toronto Western Hospital Research Institute, Toronto, Canada. *“Signal and noise: can discrepancies between diagnostic measures of structure and function inform us about glaucoma?”*
- Sept 2008 Form & Function in Ocular Disease, Dalhousie University, Halifax Canada,
“When form and function converge.”
- Apr 2008 Morgan/Sarver Symposium (23rd annual), University of California, Berkeley,
“Clinical imaging tools for glaucoma diagnosis and management.”
- Mar 2008 Grand Rounds Casey Eye Institute, Oregon Health Sciences University, *“The role of multifocal ERG and VEP in the diagnosis of vision disorders: case studies.”*
- Feb 2008 Oxyopia; U.C. Berkeley School of Optometry, Berkeley, CA,
“Bench to bedside: diagnostic methods for glaucoma research and clinical care.”
- July 2007 World Glaucoma Congress, Singapore;
 Course Co-Chair: *“Electrophysiology and glaucoma diagnosis.”*
- July 2007 World Glaucoma Congress, Singapore; Basic & Clinical Science Symposium:
“Can we clinically image axonal degeneration?”
- May 2007 Visiting Scholar Lecture, University of Alabama at Birmingham,
“Bench to bedside: diagnostic methods for glaucoma research and clinical care.”
- Dec 2005 Grand Rounds Casey Eye Institute, Oregon Health Sciences University,
“The Role of Clinical Electrophysiology in the Diagnosis of Vision Disorders”
- July 2005 World Glaucoma Congress, Vienna, Austria;
 Course Chair: *“Electrophysiology and glaucoma diagnosis.”*
- Oct 2004 Oxyopia; U.C. Berkeley School of Optometry, Berkeley, CA,
“The role of retinal, choroidal and optic nerve blood flow in experimental

- glaucoma: a nested problem in rats.*”
- Jun 2004 Thorny Issues in Ophthalmology, Devers Eye Institute, Legacy Health System
“*Is Objective Testing of the Visual System Practical?*”
- Dec 2003 Resident Lecture Series, Casey Eye Institute, Oregon Health Sciences University;
“*Electrophysiology in Glaucoma.*”
- Dec 2002 Hirsch Research Symposium; Annual Meeting of the American Academy of Optometry:
Caring for the Patient with Diabetes; “*New Electrodiagnostic Techniques for Diabetes*”
- Dec 2002 ARVO Sponsored Symposium; Annual Meeting of the American
Academy of Optometry: Electrophysiologic Testing in Visual System Disease;
“*Electrophysiologic Testing in Diabetes*”
- Dec 2002 Ellerbrock Continuing Education; Annual Meeting of the American
Academy of Optometry: *New Ideas in Glaucoma*; “*Application of the Multifocal
Technique for Objective Evaluation of the Visual Field in Glaucoma*”
- Nov 2002 Grand Rounds Casey Eye Institute, Oregon Health Sciences University,
“*Recent advances in electrophysiology: the multifocal technique. Case studies.*”
- Dec 2001 Neurological Sciences Institute, Oregon Health Sciences University,
“*Comparison of conventional and multifocal VEPs*”
- Mar 2000 Indiana University College of Optometry:
“*Recent advances in visual electrophysiology: the multifocal technique*”
- Oct 1999 49th Annual Alumni Educational Program and Reunion;
U.C. Berkeley School of Optometry:
- Oct 1995 45th Annual Alumni Educational Program; U.C. Berkeley School of Optometry:
“*A Guided Tour of the Peripheral Retina for the Primary Care Optometrist*” and
“*A Guided Tour of Macular Disease for the Primary Care Optometrist*”

Community Service

- Supervision of Vision and Glaucoma Screenings, Portland, OR
- OASIS Lectures – “The Aging Eye and Vision”, Portland, OR
- Lectures to Native American Tribes – Diabetes and the Eye: Preventative Care
- Volunteer for *The Flying Doctors*, Mexico

Teaching Experience

A. Undergraduate Students:

1. "Pathogenesis and clinical-pathologic correlates of diabetic retinopathy."
In: Molecular & Cell Biology of Ocular Disease.
UC-Berkeley: Molecular & Cell Biology 135V, 1996 & 1997.
2. "Myopia, hyperopia, astigmatism and presbyopia- what are they?"
In: The Eye & Vision in a Changing Environment
UC-Berkeley: Optometry 10, 1995 & 1996.
3. Supervision of Summer Research Interns, Discoveries in Sight, Devers Eye Institute,

1999-present

B. Optometry and Vision Sciences Graduate Program (PhD) students:

1. “Color vision defects- rationale for testing.” (Lectures on Clinical Color Vision Testing)
In: Light and Color. UC-Berkeley: Vision Sciences 112: 1994-1996.
2. Senior Instructor, Light and Color Physiology. Vision Sciences 112 Laboratory: 1994-1996
3. “Anatomy and Physiology of the Eye.” Vision Science 106 Discussion Section:
Spring, 1997. Discussion section facilitator (problem based learning series).
4. Instructor, “Teaching Methods” Vision Sciences 300, Fall 1993.

C. Clinical Instruction of 3rd and 4th-year optometry students:

Primary Care, Ocular Disease, and Contact Lens Clinics. 1992-1998.

D. Supervision of 4th-year Optometry Students Thesis Research Projects: UC-Berkeley 1996-8.

E. Graduate Student: Thesis Advisor, Jonathan Wall, Masters, Architecture, UC-Berkeley 1997.

F. Supervision of Post-Doctoral Research Fellow: Dr. Bang V. Bui, OD, PhD; DIS, 2002-2004.

G. Supervision of Post-Doctoral Research Fellow: Dr. Carla J. Abbott, OD, PhD; DIS, 2011-2013.

Research Support**Current Support**

R01EY030590 (PI: Fortune, B) 9/1/2019 - 6/30/2023 3.0 calendar

NIH/NEI

Role: Principal Investigator

Advancing OCT evaluation to reveal early-stage changes in glaucoma

The major goal of this project is to advance novel techniques for analysis of OCT scans to reveal early-stage damage and distress of retinal ganglion cells prior to their irreversible loss in experimental glaucoma.

R21EY031120 (PI: Meyer, JS; MPI: Fortune, B) 8/1/2019 - 7/31/2020 1.2 calendar

NIH/NEI

Role: Co-Principal Investigator

Targeting the diversity of retinal ganglion cells for replacement therapy

The major goals of this project are to establish the feasibility of transplantation of human pluripotent stem cell–derived retinal ganglion cells (hPSC-derived RGCs) into the nonhuman primate retina and to identify hPSC-derived RGC subtypes that more efficiently integrate in healthy and glaucomatous retina.

R01EY030838 (PI: Di Polo, A; MPI: Fortune, B) 6/1/2020 - 5/31/2025 3.0 calendar

NIH/NEI

Role: Co-Principal Investigator

Retinal Ganglion Cell Dendrite and Synapse Regeneration in Glaucoma: The Role of Insulin Signaling

The major goal of this project is to characterize novel bona fide targets for insulin-mediated dendrite regeneration and neuronal repair in glaucoma.

R01EY031686 (PI: Gardiner, SK) 9/30/2020 - 8/31/2024 1.2 calendar

NIH/NEI

Role: Co-Investigator

Blood Flow and Hemodynamics in Glaucoma. Major Goals: This project will provide important new information about the role of blood flow in glaucoma. It is known that blood flow in the retina is altered during the disease; this project aims to determine whether that is the result of retinal ganglion cell loss, or a factor that contributes to cell loss, or both. This will be achieved by longitudinal testing of blood flow in the optic nerve head and retina in human participants with glaucoma, and comparison against other clinical testing modalities. It will reveal new targets both for diagnostic testing and for treatment, and elucidate the processes by which glaucoma progresses and ultimately leads to blindness.

R01 EY011610 (PI: Burgoyne, CF) 4/1/2017 - 3/31/2021 Unpaid

NIH/NEI

Role: Consultant

IOP-Related Force and Failure in the Optic Nerve Head.

The principal goal of this proposal is to identify important molecular and cellular components of optic nerve head (ONH) connective tissue and retrolaminar myelin remodeling in monkey early experimental glaucoma.

Completed Support

- R01 EY019939-06 (PI: Wang, L)** 7/1/2010 - 3/31/2020 1.8 calendar
NIH/NEI
Role: Co-Investigator
The role of retinal astrocytes in dynamic blood flow autoregulation
The major goal of this project is to define the cellular and molecular mechanisms underlying hemodynamic abnormalities in glaucoma and to find a means to mitigate retinal ganglion cell damage.
- R01 EY021281-05 (PI: Burgoyne, CF)** 2/1/15 - 1/31/2020 2.4 calendar
NIH/NEI
Role: Co-Investigator
Optic Nerve Head SDOCT Imaging in Glaucoma
Major Goals: To use SDOCT imaging to test three hypotheses regarding glaucomatous damage to the visual system.
- BrightFocus Foundation (PI: Fortune, B)** 7/1/2017 – 6/30/2019 Unpaid
Role: Principal Investigator NCE to 2/29/2020
Early-stage axon damage: active transport and cytoskeletal ultrastructure within individual axons of glaucomatous non-human primate eyes.
The major goal of this project is to determine whether particular modes of non-invasive imaging are capable of reporting on the integrity of sub-microscopic structures within optic nerve fibers at an early stage of damage preceding their complete degeneration and loss from the eye.
- Glaucoma Research Foundation (PI: Fortune, B)** 3/1/2017 – 12/31/2018 Unpaid
2017 Shaffer Grant for Innovative Glaucoma Research
Role: Principal Investigator
Axonal transport of mitochondria: developing an in vivo imaging assay for glaucoma research.
The major goals of this project are to develop a reliable in vivo assay of mitochondrial transport in the rat eye.
- Collins Medical Trust (PI: Fortune, B)** 11/1/2016 – 10/31/2017 Unpaid
Role: Mentor, Co-Principal Investigator
Comparing Axon Transport and Cytoskeletal Ultrastructure by Transmission Electron Microscopy
The major goal of this project is to develop and validate an assay in rodents to correlate axonal transport and cytoskeletal integrity at the level of individual axons using TEM.
- R01 EY10145 (PI: Morrison, JC)** 4/1/2013 – 3/31/2018 Unpaid
Role: Other Significant Contributor (Consultant)
Studies in Glaucomatous Optic Nerve Damage
The goal of this project is to identify the earliest optic nerve head cell responses to elevated IOP, along with the cells responsible. These will be determined using microarray analysis of Brown Norway rat eyes with controlled elevation of IOP, in addition to PCR and immunohistochemistry.
- R21 EY024432-01 (PI: Wang, L)** 4/1/2014 – 3/31/2016 1.2 calendar
Role: Co-Investigator
Astrocyte-mediated Blood Flow Autoregulation as a Disease Mechanism in Glaucoma

The major goals of this project are to establish an ex vivo and in vivo systems to investigate the roles of astrocytes in normal blood flow autoregulation and as a potential pathological mechanism in glaucoma.

R01 EY019327 (PI: Fortune, B) 9/1/2009 - 7/31/2015 4.8 calendar

NIH/NEI

Role: Principal Investigator

Axonal cytoskeletal changes in experimental glaucoma.

The major goals of this project are to use clinical imaging tools and retinal functional tests to detect an early stage of glaucomatous damage to optic nerve axons that is characterized by abnormalities of the cytoskeleton.

R01 EY019674 (PI: Demirel, S) 9/30/2009 – 8/31/2014 1.2 calendar

NIH/NEI

Role: Co-Investigator

Predicting the rate of progression in glaucoma

The major goals of this project are to determine predictors that would enable a clinician to prevent severe visual disability or blindness in an ocular hypertensive or glaucoma patient, by identifying a rapid progression rate or a high likelihood for rapid progression at the earliest stages of the disease.

R21 EY021311 (PI: Fortune, B) 8/1/2011 - 10/31/2013 2.4 calendar

NIH/NEI

Role: Principal Investigator

Imaging retinal astrocytes, ganglion cells and axonal transport in vivo.

The goal of this project is to develop methods for evaluating two groups of cells and aspects of their function in the living eye using specialized imaging techniques.

R01 EY011610 (PI: Burgoyne, CF) 4/1/2007 - 6/30/2012 1.2 calendar

NIH/NEI

Role: Co-Investigator

IOP-Related Force and Failure in the Optic Nerve Head.

The major goals of this project are to identify the clinically important components of optic nerve head (ONH) susceptibility to glaucomatous damage using basic engineering principles.

Legacy Research Discretionary Grant (PI: Fortune, B) 6/1/2009 – 5/31/2010

Legacy Research Services, Legacy Health

Role: Principal Investigator

“Imaging axonal transport in vivo.”

The major goals of this proposal are to develop a method for in vivo imaging of axonal transport in a mammal, to evaluate the effects of perturbations on axonal transport as imaged in vivo and to generate pilot data for an NIH proposal.

National Glaucoma Research Grant (PI: Fortune, B) 4/1/2008 – 3/31/2010

American Health Assistance Foundation (AHAF)

Role: Principal Investigator

“Imaging retinal nerve fiber layer pathology in experimental glaucoma”

The major goals of this project are to use clinical imaging tools and histopathological techniques to evaluate the peripapillary retinal nerve fiber layer and the optic nerve head in experimental glaucoma.

2008 Shaffer Fund for Innovative Glaucoma Research (PI: Fortune) 1/1/2008 – 12/31/2009
Glaucoma Research Foundation (GRF)

Role: Principal Investigator

“Imaging the course of axonal degeneration in experimental glaucoma”

The major goals of this project are to whether degradation of retinal ganglion cell axonal neurofilaments and microtubules is clinically detectable in an experimental model of glaucoma.

R01 EY05231-17 (PI: Cioffi, GA)

4/01/1990-6/30/2005

NIH/NEI

Role: Co-Investigator

“Uveal Vasculature: Optic Nerve Microcirculation”

The major goals of this project are to determine the basis of early glaucomatous damage and to define optimal methods of detecting early glaucomatous visual function loss.

R01 EY03424-25 (PI: Johnson, CA)

1/01/1981-3/31/2007

NIH/NEI

Role: Co-Investigator

“Perimetry and Psychophysics in Glaucoma”

The major goal of this project is to investigate a new technique for monitoring retinal ganglion cell loss in glaucoma, the multifocal Visual Evoked Potential, and evaluate the ability of a functional (flicker adaptation abnormalities) and a structural (optic nerve head topography) indicator of early glaucomatous damage to predict the onset and location of future visual field loss.

Glaucoma Research Pilot Project (PI: Fortune, B)

2/1/2004 – 1/31/2005

Glaucoma Research Foundation (GRF)

Role: Principal Investigator

“Effects of Acutely Elevated IOP on Retinal Structure and Function in Pigmented Rat”

The purpose of this project is to identify the level of IOP that causes temporary, and then permanent loss of function among the different cell types within the retina. In particular, we are interested in the effects of a relatively short-term pressure elevation or ‘spike’. We will compare changes in the functional status of different retinal cell types with their microscopic appearance so to determine the relationship between structural and functional damage.

Legacy Research Advisory Committee Grant (PI: Fortune, PI)

5/11/2006 – 5/31/2007

Legacy Research Services, Legacy Health

Role: Principal Investigator

“Assessment of bilateral optic atrophy in non-human primates.”

The major goals of this proposal are: 1) to obtain magnetic resonance imaging (MRI) scans of the orbits, visual pathways and brain in six rhesus macaques with idiopathic Bilateral Optic Atrophy (BOA) in order to determine whether additional signs of neuro-degenerative disease are present and to rule-out a compressive etiology for optic atrophy; 2) to establish a fibroblast cell line from sub-cutaneous and/or muscle biopsies, which will then be tested for mitochondrial function; 3) to screen ocular fundus photographs from 500 rhesus monkeys at the Oregon National Primate Research Center to determine whether evidence of BOA appears in any of these animals, and thus establish an estimate of prevalence, range of severity and inheritance pattern (if any).

Legacy Research Services Grant (PI: Fortune, B)

4/01/2003 – 3/31/2004

Legacy Research Services, Legacy Health

Role: Principal Investigator

“Chronology of Functional Deficits in a Rat Model of Elevated Intraocular Pressure”

The major goals of this project are (1) to evaluate the retinal cellular contributions to the rat full-field ERG under various stimulus conditions, with particular emphasis on ganglion cell contributions; and (2) to characterize retinal functional changes in a rat model of glaucoma based on chronically elevated IOP.

M.J. Murdock Charitable Trust Grant (PI: Cioffi, GA; Co-PI: Fortune, B) 4/01/2000 – 3/31/2003

Role: Co-Principal Investigator

“Evaluation of Multifocal Electroretinogram (MERG) for Use in Glaucoma”

The major goal of this project is to evaluate the Multifocal Electroretinogram, in comparison to standard diagnostic procedures, as well as to other new, highly sensitive diagnostic instruments for detection of early vision damage caused by glaucoma.

Oregon Lions Sight & Hearing Foundation (PI: Fortune, B)

12/27/2002 – 12/31/2003

Role: Principal Investigator

“Retinal Function Testing in Diabetes & Glaucoma.”

The major goal of this grant was to develop normative ranges for advanced testing algorithms by multifocal electroretinography.

Book Chapters

1. Burgoyne CF, Ivers K, Yang H, Chauhan BC, Fortune B. OCT anatomy for glaucoma: Emerging relationships of interest. In: Iester M, Garway-Heath DT, Lemij H, eds. *Glaucoma Imaging*. Milan: Publicomm; 2017; 1:13-19.
2. Graham S, Fortune B. Electrophysiology in Glaucoma Assessment. In: Shaarawy TM, Sherwood MB, Hitchings RA, Crowston JG, eds. *Glaucoma*. London: Elsevier; 2015; 1:149-168.
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Peer-Reviewed Publications

1. Lowry EA, Mansberger SL, Gardiner SK, Yang H, Sanchez F, Reynaud J, Demirel S, Burgoyne CF, **Fortune B**. Association of optic nerve head prelaminar schisis with glaucoma. *Am J Ophthalmol*. 2020 (*in press*). [https://www.ajo.com/article/S0002-9394\(20\)30603-6/fulltext](https://www.ajo.com/article/S0002-9394(20)30603-6/fulltext)
2. Gardiner SK, Mansberger SL, **Fortune B**. Time Lag Between Functional Change and Loss of Retinal Nerve Fiber Layer in Glaucoma. *Invest Ophthalmol Vis Sci*. 2020;61:5. [PMID: 33141891](#)
3. Sanchez F, Sanders DS, Moon JJ, Gardiner SK, Reynaud J, **Fortune B**, Mansberger SL. Effect of Trabeculectomy on OCT Measurements of the Optic Nerve Head Neuroretinal Rim Tissue. *Ophthalmology Glaucoma*. 2020;3:32-39. [PMC7337263](#)
4. Zhao D, He Z, Wang L, **Fortune B**, Lim JKH, Wong VHY, Nguyen CTO, Bui BV. Response of the Trilaminar Retinal Vessel Network to Intraocular Pressure Elevation in Rat Eyes. *Invest Ophthalmol Vis Sci*. 2020;61:2. [PMC7325622](#)
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8. Gardiner SL, Cull G, **Fortune B**, Wang L. Increased Optic Nerve Head Capillary Blood Flow in Early Primary Open-Angle Glaucoma. *Invest Ophthalmol Vis Sci*. 2019;60:3110-3118. [PMC6645706](#)
9. Hong S, Yang H, Gardiner SK, Luo H, Hardin C, Sharpe GP, Caprioli J, Demirel S, Girkin CA, Liebmann JM, Mardin CY, Quigley HA, Scheuerle AF, **Fortune B**, Chauhan BC, Burgoyne CF. OCT-Detected Optic Nerve Head Neural Canal Direction, Obliqueness and Minimum Cross-Sectional Area in Healthy Eyes. *Am J Ophthalmol*. 2019;208:185-205. [PMC6851461](#)
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