

Curriculum Vitae

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Education

<u>Dates</u>	<u>Institution</u>	<u>City</u>	<u>Degree</u>
1985-1990	Univ. of MN	Mpls, MN	Ph.D., Physiology
1977-1979	Univ. of MN	St. Paul, MN	M.S., Animal Physiology
1969-1973	Rockford College	Rockford, IL	B.A. cum laude, Biology

Post-Degree and Continuing Education Training

January 2012 to December 2013	ILEAD leadership course, UNMC
January 2000 to July 2000	Sabbatical, Allergan, Irvine, CA
January 1990 to October 1990	Post-Doctoral Fellowship: Neuroscience lab of Robert Miller, M.D., Univ of MN, Mpls, MN

Academic Appointments

July 2014 to present	25% time, Director of Glaucoma Research Professor Department of Ophthalmology Univ. Neb. Med. Ctr, Omaha, NE
July 2007 to June 2014	Director of Glaucoma Research and Tenured Professor Department of Ophthalmology Professor, Courtesy appointment, Department of Physiology, Univ. Neb. Med. Ctr, Omaha, NE
June 2015 to April 2019	Tenured Professor, Vice Chair of Translational Research Department of Ophthalmology and Visual Sciences Professor, Courtesy Appointment, Depart. Physiology Case Western Reserve University
July 2014 to June 2015	Visiting Professor Department of Ophthalmology and Visual Sciences Case Western Reserve University
September 2011 to March 2013	Director of Clinical Research, Univ Neb Med Ctr, Omaha, NE
July 2001 to June 2007	Director of Glaucoma Research and Tenured Associate Professor, Depart. Ophthalmology Associate Professor, Courtesy appointment, Depart. Physiology, Univ. Neb. Med. Ctr, Omaha, NE
March 1993 to June 2001	Assistant Professor, Courtesy appointment Depart. Physiology, Univ. Neb. Med. Ctr, Omaha, NE

March 1993 to present

Member Graduate Faculty
University of Nebraska Medical Center, Omaha, NE

October 1990 to June 2001

Director of Glaucoma Research and Assistant Professor
Depart. Ophthalmology, Univ. Neb. Med. Ctr, Omaha, NE**Current Grant/Contract Support**

Pharmaceutical company (Toris)

11/26/13-12/31/2019

Nicox

Title: Nitric oxide donating compounds for the treatment of glaucoma

The goals of this project are screen and select new nitric oxide donating compounds for use in glaucoma therapy. The experiments are done in my nonhuman primates. I am directing the research at UNMC.

Pharmaceutical company (Toris)

04/01/19-12/31/19

Santen 502Qm030

Title: Effect of sepetaprost ophthalmic solution on intraocular pressure in monkeys

The goal of the study is to determine the mechanism by which an EP2 agonist lowers IOP in nonhuman primates.

Pharmaceutical company (Toris)

04/01/19-12/31/19

Santen 502Qq010

Title: Effect of sepetaprost ophthalmic solution on intraocular pressure in monkeys

The goal of the study is to determine the mechanism by which an EP2 agonist lowers IOP in nonhuman primates.

2R01 EY022124-05 (Moroi)

08/01/2019-07/31/2023

Title: Genetic Markers for Variations in IOP and Aqueous Flow Responses to Beta-blockers

The goal of this project is to identify physiological factors that profile an individual's variance of IOP and variation in glaucoma treatment response to beta-blocker and prostaglandin treatments among patients with ocular hypertension or early stage glaucoma.

Consulting Positions, Past and Present

Abide Therapeutics

Alcon Laboratories

Allergan

Allysta

Altheos

Aries

Glaukos

Ivantis

Liquidia

MemX

Ono
Perfusion Thx
Pfizer
Sanofi
SensiMed
Sight Science
Sucampo Pharmaceuticals, Inc.
Transcend Medical
University of Florida, Gainesville, FL

Reviewer/Editorial Boards

AED study section ad hoc reviewer
National Eye Institute
10/2002, 10/2003, 2/2004, 11/2004, 2/2010, 10/2014

Grant Reviewer
Stimulus money study section ad hoc reviewer
National Eye Institute
11/2009

Grant Reviewer
STTR/SBIR
Sensory Systems
National Institutes of Health
11/2011

Grant Reviewer
The Royal College of Ophthalmologists international glaucoma association research awards
03/2013

Grant Reviewer
Hong Kong, General Research Fund Grants
03/2013, 03/2014

Grant Reviewer
Israel Science Foundation Grants
03/2013

Grant Reviewer
Fight for Sight
05/2012, 05/2013, 05/2014, 3/2016, 3/2017, 3/2018, 3/2019

Manuscript reviewer (average of 18 per year)
American Journal of Ophthalmology
Archives of Ophthalmology
British Journal of Ophthalmology

British Journal of Pharmacology
Clinical Ophthalmology
Current Eye Research
Current Molecular Medicine
Current Pharmaceutical Design
Drugs and Aging
Experimental Eye Research
Expert Opinion on Pharmacotherapy
Expert Review of Ophthalmology
European Journal of Pharmacology
Investigative Ophthalmology and Visual Science
Journal of Applied Physiology
Journal of Functional Biomaterials
Journal of Glaucoma
Journal of Ocular Pharmacology and Therapeutics
Journal of Ophthalmology
Journal of Ophthalmology and Clinical Research
Journal of Physiology
Molecular Vision
Neurochemical Research
Omics Publishing Group
The Open Ophthalmology Journal
Ophthalmology
Optometry and Visual Science
Plos One
PNAS
Scientific World Journal
Survey of Ophthalmology
Translational Visual Science and Technology
US Ophthalmic Review
Veterinary Ophthalmology
Visual Neuroscience
Yonsei Medical Journal

Editorial Boards

Associate editor, JOPT, 2013-present
Section editor, CMM, 2011-present

Honors and Awards

1969-1973 Jane Addams Scholarship, Rockford College
1989 IJ Fox Memorial Award for graduate research in physiology, University of Minnesota
1993 Ruth Salta Junior Investigator Achievement Award, American Health Assistance Foundation
2006 Dr. Stan Truhlsen Research Award, Prevent Blindness Nebraska
2009 ARVO FARVO, Gold award

2010 Silver U Award, UNMC
2015 Distinguished Service Award, ARVO
2019 Distinguished Service Award, AOPT

Memberships and Offices in Professional Societies

AALAS, 2005-2012

American Physiological Society, 2004-2012

American Glaucoma Society, 2003-present, session moderator, 2016

Association for Research in Vision and Ophthalmology (ARVO), 1984-present

Animals in Research Committee: member, 1996-1998, 2010-2015, chairman: 2005-2007;

Organizer of Animals in Research Symposium, 1997, 2006

Organizer of Serotonin mini symposium, 2009

Organizer of Camras Memorial mini symposium, 2010

Diversity Issues Committee 1998-2000, 2010-2015

Session Moderator, 2005, 2006, 2010, 2014, 2015, 2016, 2017, 2018, 2019 (2 sessions)

Program Committee, 2005-2008

Trustee, 2010-2015

Vice President Elect, 2013-2014

WEAVR Silent Auction Committee, 2014, 2015, Luncheon host 2017, raffle committee 2017

Vice President, 2014-2015

Mentoring program, 2015-2016 and 2018-2019

International Society for Eye Research (ISER), 1986-present

Committee on Integration with Research Organizations, 2002

Experimental Eye Research Journal Committee, 2002

Session Organizer, 2006, 2008

Elected member of Membership Committee, 2008-2011

Program committee 2010, abstract reviewer and travel award grant reviewer

Session organizer 2102, animal models of glaucoma

Session moderator 2012

Session organizer/moderators, 2018, personalized medicine

Treasurer, 2019-present

Association for Ocular Pharmacology and Therapeutics (AOPT), 1995-present

Program Committee, 2000, 2003, 2005, 2007, 2013

Trustee, 2002-2013

Website manager, 2003-2013

Session moderator, 2003, 2005, 2015, 2017, 2019

Session organizer, 2013, 2015, 2017, 2019

Secretary, 2015-2019

International Society for Ocular Fluorometry, 1996-2009

Invited Speaker, 2005
President, 2005 - 2009

Society for Neuroscience, 1988-1992

Meeting co-organizer, Trabecular Meshwork Aqueous Humor Dynamics (TMAHD) meeting
Cleveland, Ohio, Aug, 2015 and April, 2017. Meetings by invitation.

Campus Committee Assignments

Comparative Medicine Advisory Board, 2004-2016

Institutional Animal Care and Use Committee (IACUC), 1992-2010
Vice Chairman - 1998-1999

Clinical Investigation Advisory Board, 2003-2007

Reviewer of abstracts for Midwest Student Biomedical Research Forum, 1993 - 2005.

Gifford Advisory Committee, 1995-2005

Summer Undergraduate Research Program Committee, 2005

Reviewer of graduate fellowships, 2012

IACUC electronic forms committee, 2012

Interviewer for medical school applicants, CWRU, 2015-2019

Committee on Promotion and Tenure, CWRU, 2018-2019

Interviewer for Preprofessional Scholars Program (PPSP), CWRU, 2019

Community Service

Member, Lion's Club of Omaha, 1994 to 2011
Member of the Board, 1997, 1999, 2001
Chairman of Diabetes Awareness Committee, 1996 - 1999
Secretary, 2001 - 2004
Volunteer for multiple health fairs with glaucoma screenings.

Bibliography

Articles Published in Scholarly Journals

Toris CB and Pederson JE. Experimental retinal detachment. VII. Intravenous horseradish peroxidase diffusion across the blood-retinal barrier. *Arch Ophthalmol* 102 (5): 752-756, 1984.

Suguro K, Toris CB, and Pederson JE. Uveoscleral outflow following cyclodialysis in the monkey eye using a fluorescein tracer. *Invest Ophthalmol Vis Sci* 26 (6): 810-813, 1985.

Toris CB and Pederson JE. Experimental retinal detachment. VIII. Retinochoroidal horseradish peroxidase diffusion across the blood-retinal barrier. *Arch Ophthalmol* 103 (2): 266-269, 1985.

Toris CB and Pederson JE. Effect of intraocular pressure on uveoscleral outflow following cyclodialysis in the monkey eye. *Invest Ophthalmol Vis Sci* 26 (12): 1745-1749, 1985.

Pederson JE and Toris CB. Experimental retinal detachment. IX. Aqueous, vitreous, and subretinal protein concentrations. *Arch Ophthalmol* 103 (6): 835-836, 1985.

Toris CB and Pederson JE. Aqueous humor dynamics in experimental iridocyclitis. *Invest Ophthalmol Vis Sci* 28 (3): 477-481, 1987.

Toris CB, Gregerson DS, and Pederson JE. Uveoscleral outflow using different sized fluorescent tracers in normal and inflamed eyes. *Exp Eye Res* 45 (4): 525-532, 1987.

Pederson JE and Toris CB. Uveoscleral outflow: diffusion or flow? *Invest Ophthalmol Vis Sci* 28 (6): 1022-1024, 1987.

Tsuboi S, Pederson JE, and Toris CB. Functional recovery of retinal pigment epithelial damage in experimental retinal detachment. *Invest Ophthalmol Vis Sci* 28 (11): 1788-1794, 1987.

Emi K, Pederson JE, and Toris CB. Hydrostatic pressure of the suprachoroidal space. *Invest Ophthalmol Vis Sci* 30 (2): 233-238, 1989.

Toris CB, Pederson JE, Tsuboi S, Gregerson DS, and Rice TJ. Extravascular albumin concentration of the uvea. *Invest Ophthalmol Vis Sci* 31 (1): 43-53, 1990.

Toris CB, Camras CB, and Yablonski ME. Effects of PhXA41, a new prostaglandin $F_{2\alpha}$ analog, on aqueous humor dynamics in human eyes. *Ophthalmology* 100 (9): 1297-1304, 1993.

Toris CB, Eiesland JL, and Miller RF. Morphology of ganglion cells in the neotenus tiger salamander retina. *J Comp Neurol* 352 (4): 535-559, 1995.

Toris CB, Tafoya ME, Camras CB, and Yablonski ME. Effects of apraclonidine on aqueous humor dynamics in human eyes. *Ophthalmology* 102 (3): 456-461, 1995.

Toris CB, Gleason ML, Camras CB, and Yablonski ME. Effects of brimonidine on aqueous humor dynamics in human eyes. *Arch Ophthalmol* 113 (12): 1514-1517, 1995.

Toris CB, Yablonski ME, Wang Y-L, and Hayashi M. Prostaglandin A_2 increases uveoscleral outflow

and trabecular outflow facility in the cat. *Exp Eye Res* 61 (6): 649-657, 1995.

Toris CB, Camras CB, Yablonski ME, and Brubaker RF. Effects of exogenous prostaglandins on aqueous humor dynamics and blood-aqueous barrier function. *Surv Ophthalmol* 41 (Suppl. 2): S69-S75, 1997.

Zhan G-L, Toris CB, Camras CB, Wang Y-L, and Yablonski ME. Bunazosin reduces intraocular pressure in rabbits by increasing uveoscleral outflow. *J Ocular Pharmacol Ther* 14 (3): 217-228, 1998.

Zhan G-L, Toris CB, Camras CB, Wang Y-L, and Bito LZ. Prostaglandin-induced iris color darkening. An experimental model. *Arch Ophthalmol* 116 (8): 1065-1068, 1998.

Wang Y-L, Zhan G-L, Toris CB, and Yablonski ME. Effects of topical epinephrine on aqueous humor dynamics in feline eyes. *Exp Eye Res* 68:439-445, 1999.

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Toris CB, Yablonski ME, Camras CB, and Wang Y-L. Aqueous humor dynamics in the aging human eye. *Am J Ophthalmol* 127:407-412, 1999.

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Toris CB, Zhan GL, Camras CB, Wang YL, Yablonski ME, McLaughlin MA. Aqueous humor dynamics in monkeys with laser-induced glaucoma. *J Ocular Pharm Ther* 16:19-27, 2000.

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Wang Y-L, Hayashi M, Yablonski ME and Toris CB: Effects of multiple-dosing of epinephrine on aqueous humor dynamics in human eyes. *J Ocular Pharm* 18:53-63, 2002.

Weinreb RN, Toris CB, Gabelt BT, Lindsey JD, Kaufman PL. Effects of prostaglandins on the aqueous humor outflow pathways. *Surv Ophthalmol* 47, Suppl 1:S53-S64, 2002.

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http://www.xpharm.com/citation?Article_ID=9659

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http://www.xpharm.com/citation?Article_ID=8785

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http://www.xpharm.com/citation?Article_ID=8948

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http://www.xpharm.com/citation?Article_ID=1162

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Lane JT, Larson L, Fan S, Stoner JS, Margalit E, Toris CB. Intraocular Pressure, Blood Pressure, Ocular Blood Flow, Outflow Facility and Aqueous Humor Flow During a Euglycemic-Hyperinsulinemic Clamp in Patients With Type 1 Diabetes With Microalbuminuria and Retinopathy. *BMC Ophthalmol, BMC Ophthalmology* 2010, 10:19.

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171. Fuwa, Masahiro; Toris, Carol B.; Fan, Shan; Taniguchi, Takazumi; Ichikawa, Masaki; Odani-Kawabata, Noriko; Iwamura, Ryo; Yoneda, Kenji; Matsugi, Takeshi; Shams, Naveed; Zhang, Jin-Zhong. Effects of a Novel Selective EP2 Receptor Agonist, Omidenepag Isopropyl, on Aqueous Humor Dynamics in Laser-induced Ocular Hypertensive Monkeys. ARVO 2018 poster

172. Chan, Eric; Anunike, Ganiru; Helms, Richard; Pattabiraman, Padmanabhan; Toris, Carol. Effect of Pneumatography on Anterior Chamber Biometrics in Rabbit Eyes. ARVO poster 2018

173. Pattabiraman, Padmanabhan, Toris Carol B. Clusterin Modulates Extracellular Matrix Homeostasis in the Trabecular Outflow Pathway. ARVO talk 2018

174. Moroi, Sayoko E.; Ferguson, Simone; Reed, David M.; Gulati, Vikas; Kazemi, Arash; Sit, Arthur J.; Musch, David C.; Toris, Carol B. Relationship between corneal hysteresis and positional change in intraocular pressure in healthy adults. ARVO 2018

175. Ajay Kolli, David Reed, Jesse Gilbert, Carol Toris, Arthur Sit, Vikas Gulati, Arash Kazemi, David Musch, Sayoko Moroi. Effects of Timolol and Latanoprost on Ocular Perfusion Pressure in Eyes of Healthy Volunteers. ARVO 2019

176. Fan S, Prasanna G, Adams CM, Towler C, Toris CB. Effects of a Soluble Guanylate Cyclase Activator (AL-EF-58-MF61) on IOP and Aqueous Humor Dynamics in Monkeys. ARVO 2019

177. Impagnatiello F., Bastia E., Toris C., Fan S., Brambilla S. Galli C., Almirante N., Bergamini M.V.W. NCX 1741, a novel NO-donating derivative of the phosphodiesterase-5 inhibitor avanafil, reduces IOP in models of ocular hypertension and glaucoma. ARVO 2019

178. András M. Komáromy, Kristin L. Koehl, Christine D. Harman, Sanford L. Boye, Juan P. Steibel, Leandro B. Teixeira, Carol B. Toris, Sayoko E. Moroi, Shannon E. Boye. Long-term stable intraocular pressure (IOP) control following AAV-mediated ocular gene therapy in a canine model of ADAMTS10-open-angle glaucoma (OAG). ARVO 2019

179. Toris, Carol; Helms, Richard; Chan, Eric; Anunike, Ganiru; Girish, Kshama; Buzzard, Joshua; Pattabiraman, Padmanabhan. Validation of changes in anterior chamber biometrics in rabbit eyes measured by ultrasound biomicroscopy. ARVO 2019

180. Christine D. Harman, Kristin L. Koehl, Carol B. Toris, Leandro B. Teixeira András M. Komáromy. Fluorophotometric determination of aqueous humor flow rates (AHFRs) in a canine model of ADAMTS10-Weill Marchesani syndrome-associated open-angle glaucoma (WMS-OAG). ARVO 2019

181. Pattabiraman, Padmanabhan P; Vuda, Sai Supriya, Heo, Jaeyoung, Toris, Carol B, Rhee, Douglas J. Clusterin-Cathepsin K Signaling in Trabecular Meshwork Outflow Pathway Regulates Intraocular Pressure. ARVO 2019

182. Toris CB. Talk: Age and ethnic differences in the eye show the need for personalized medicine. ISER, Belfast, Northern Ireland, 2018.

183. Ropo A, Aihara M, Lu F, Kawata H, Iwata A, Taniguchi T, Fuwa M, Toris CB, Fan S, Odani-Kawabata N. Omidenepag isopropyl 0.002%: a novel ocular hypotensive agent with a new mechanism of action. World Glaucoma Conference, Melbourne Australia, 2019.

Invited Presentations

1991, October, Aqueous humor dynamics in normal and inflamed eyes, Creighton University, Omaha, NE

1992, September, Effects of a new prostaglandin analog, PhXA41, on aqueous humor dynamics, International Society for Eye Research, Stresa, Italy

1993, March, Glaucoma and glaucoma research, Omaha Public Power District, Omaha, NE

1995, May, Mechanism of the ocular hypotensive effect of latanoprost and the maintenance of normal blood-aqueous-barrier function, 9th International Symposium on the Ocular Effects of Prostaglandins and other Eicosanoids, Fort Lauderdale, FL

1996, February, Effects of α_2 -adrenergic agonists on aqueous humor dynamics, Allergan Glaucoma Seminar Series. Irvine, CA

1996, October, Uveoscleral outflow, effects of aging and prostaglandin treatment, International Society for Eye Research, Yokohama, Japan

1997, October, Uveoscleral drainage of ocular aqueous humor, National Eye Institute, Bethesda, MD

1997, February, Uveoscleral outflow, Medical University of South Carolina, Charleston, SC

1998, July, A fluorophotometric method detects decreased uveoscleral outflow in ocular hypertensive patients and healthy aging subjects, International Society for Eye Research, Paris, France

1999, March, Chronic effects of brimonidine on uveoscleral flow, Allergan Glaucoma Seminar Series. Irvine, CA

1999, May, Acute versus chronic effects of brimonidine on aqueous humor dynamics, University of Alabama at Birmingham, Birmingham, AL

1999, June, Uveoscleral outflow of ocular aqueous humor in humans, Mayo Clinic, Rochester, MN

2000, May, Alpha₂ adrenergic agonists and aqueous humor dynamics, Allergan, Irvine, CA

2000, June, Uveoscleral outflow of ocular aqueous humor, UC San Diego, CA

2000, November, Ocular hypotensive mechanisms of action of alpha₂ adrenergic agonists, AOPT meeting, keynote speaker, Birmingham, AL

2001, February, Glaucoma and glaucoma research, Boys Town Hospital, Omaha, NE

2001, February, Aqueous flow and diabetes, NEI, Bethesda, MD

2001, March, Aqueous humor dynamics in ocular hypertensive patients, American Glaucoma Society Meeting, Newport Beach, CA

2001, April, Aqueous humor dynamics of brinzolamide and AL-6598 in animal models, Alcon, Ft. Worth, TX

2004, September, Aqueous flow versus aqueous production, International Society for Eye Research, Sidney, Australia

2004, January, Uveoscleral Outflow, Bend Research, Bend, OR.

2004, April, panelist for ARVO Animals in Research workshop on Optimizing the use of animals in vision research: a panel-led group discussion, Ft. Lauderdale, FL

2004, May, Travoprost and aqueous humor dynamics. Alcon Laboratories, Ft. Worth, TX

2004, December, Aqueous humor dynamics in sickness and in health, University of Arizona, Tucson, AZ

2004, December, Use of fluorophotometry to measure aqueous humor dynamics in non-human primates, Pfizer, San Diego, CA

2006, May, Panelist for ARVO/Pfizer Institute, Aqueous humor outflow, what do we know, where will it lead us? Ft. Lauderdale, FL

2006, July, Studies of aqueous humor dynamics, University of Florida, Gainesville, FL

2006, November, Lesser known aqueous humor outflow pathways, International Congress for Eye Research, Buenos Aires, Argentina

2007, October, The role of aqueous humor dynamics in clinical syndromes associated with elevated intraocular pressure, UNMC, Omaha, NE

2008, September, Clinical Studies of Aqueous Humor Dynamics, EEENT Hospital of Fudon University, Shanghai, China

2008, September, Serotonin Receptors in Ocular Hypertension and Glaucoma, ICER special session on Novel Ocular Drug Receptors, Beijing, China

2008, October, Clinical Studies of Aqueous Humor Dynamics, keynote speaker in the Ganzu-Nebraska Glaucoma Research Forum, People's Hospital of Ganzu Province, Lanzhou, China

2009, February, What regulates aqueous flow? Association for Ocular Pharmacology and Therapeutics, Salzburg, Austria

2009, March, Aqueous humor outflow in health and disease, The Cutting Edge: Innovative Glaucoma Surgery Symposium, Del Mar, CA

2009, May, Serotonin and aqueous humor dynamics, ARVO SIG, Ft. Lauderdale, FL

2009, July, Is uveoscleral outflow changed in glaucoma, World Glaucoma Conference, Boston, MA

2009, July, Aqueous humor dynamics in health and disease. Boston University. Boston, MA

2009, July, Ivantis meeting, Effects of a glaucoma drainage device on Schlemm's canal, an SEM study, Boston, MA

2010, March, SEMs of Schlemm's Canal, The Cutting Edge: Innovative Glaucoma Surgery Symposium II, Naples, FL

2010, March, Physiology of the Suprachoroidal Space, The Cutting Edge: Innovative Glaucoma Surgery Symposium II, Naples, FL

2010, July, Day and Night Differences in Aqueous Humor Dynamics in Rabbits Compared to Humans, ISER meeting, Montreal, Quebec, Canada

2010, December. Measuring Diurnal and Nocturnal IOP – Devices - 24 hour IOP variability in animal models. Sleep and Glaucoma Think Tank, NYC, NY

2011, March, invited discussant at the The Cutting Edge: Innovative Glaucoma Surgery Symposium III, Dana Point, CA

2011, April, The Use of Non Human Primates in Ocular Research. AALAS District Meeting, Omaha, NE

2011, June, Day And Night Differences In Aqueous Humor Dynamics In Patients With Ocular Hypertension Treated With Latanoprost, Dorzolamide And Timolol, in symposium on Best of AGS at the World Glaucoma Conference, Paris, France

2011, June, Measuring Aqueous Humor Dynamics in Animal Models, faculty participant in course C24 on animal models of glaucoma, (Chosen as one of the best of AGS), World Glaucoma Conference, Paris, France

2011, September, Day And Night Differences In Aqueous Humor Dynamics In Patients With Ocular Hypertension Treated With Latanoprost, Dorzolamide And Timolol, Tongji University Seminar, Shanghai, China

2011, September, Clinical studies of aqueous humor dynamics and intraocular pressure. Hiser Hospital, Quingdao, China

2011, September, Day And Night Differences In Aqueous Humor Dynamics In Patients With Ocular Hypertension Treated With Latanoprost, Dorzolamide And Timolol, Chinese Ophthalmological Society Meeting, Guangzhou, China

2012, February, Day and night effects of four glaucoma drugs on aqueous humor dynamics in patients with ocular hypertension, GTC conference, Las Vegas, NV

2012, May, Panelist for ARVO/Pfizer Institute, Aqueous humor outflow, what have we learned? Ft. Lauderdale, FL

2012, June, Pharmacotherapies for glaucoma: Current drugs and future candidates. Catania University, Catania, Italy

2013, April, Ivantis Innovation Summit II. Quantitative differences among novel glaucoma devices in a human perfusion model, San Francisco.

2013, May, ARVO Aqueous Humor Dynamics: New Approaches – SIG. Presentation: Aqueous Flow by Fluorophotometry in the Mouse.

2013, July, Aqueous humor dynamics in glaucoma. New Insights. World Glaucoma Congress, Vancouver, BC, Canada

2013, September, Aqueous humor dynamics in health and disease. Case Western Reserve University, Cleveland, OH

2013, October, Glaucoma treatments in development, Tenth People's Hospital, Shanghai, China

2013, October, Setting up a research study at UNMC, Tenth People's Hospital, Shanghai, China

2014, March, The pros and cons of animal models of glaucoma. GTC meeting, San Diego, CA

2014, June, Age effects on aqueous humor dynamics in healthy Chinese volunteers, International Biomedical Research Forum, UNMC, Omaha, NE

2014, June, Changes in ocular physiology during puberty affect efficacy of intraocular pressure lowering drugs, CWRU Ophthalmology Symposium, Cleveland, OH

2015, January, Ocular fluid dynamics and pressure in health and disease, Department of ENT, CWRU seminar, Cleveland OH

2015, January, Ocular aqueous humor dynamics in health and disease, College of Optometry, Ohio State University seminar, Columbus, OH.

2015, April, Physiology of Uveoscleral Outflow. Chinese Ophthalmological Society Meeting, in conjunction with the Asian Pacific Academy of Ophthalmology, Guangzhou, China.

2015, May, Aqueous humor dynamics in health and disease, Department of Physiology, Case Western Reserve University, Cleveland, OH

2015, August, Aging and aqueous humor dynamics. Outflow meeting, Nantucket, MA

2015, December, Outflow facility in SPARC knockout mice. TM society meeting, San Diego, CA

2016, April 1, Aqueous humor dynamics modulation for intraocular pressure management and glaucoma therapy. NEOMED symposium, Rootstown, OH.

2016. May, ARVO Crossectional Group session - NT Group - Large versus Small Animal Models for Eye Research: Matching Models with Translational Research Needs.

Presentation: Toris C. Non-human primates as a preferred basic and translational model for glaucoma therapeutics, Seattle, Washington

2016. May, ARVO, Minisymposium - Personalized medicine in ocular pharmacology: Differences with gender and race.

Presentation. Toris C. Gender and race differences in IOP and aqueous humor dynamics. ARVO 2016 abstract 4318, Seattle, Washington

2016. May, ARVO, Minisymposium - Fluids inside and around the eyes in ocular health and pathologies

Presentation: Toris C. Aqueous humor dynamics in health and disease, Seattle, Washington

2016. September, ISER. Translational studies in glaucoma-How do we make basic science studies in glaucoma more clinically relevant: development of a consensus?

Presentation: Toris C. What is the role of the basic science research laboratory? Tokyo, Japan.

2017. May 26. Modulation of aqueous humor dynamics for intraocular pressure management and glaucoma therapy. Grand Rounds. University of Wisconsin, Madison.

2017. June 26. ARC Tech Talk. Rabbits for ocular research. CWRU.

2017. July 27. Aqueous humor dynamics in glaucoma. Bascom Palmer Eye Institute. University of Miami, Miami, Florida

2017. October 19. Aqueous humor dynamics in health and disease. Michigan State University, East Lansing, MI.

June 15, 2018, Omaha, Gifford Truhlsen conference. Title: Outflow facility comparisons of three MIGS. Audience: Basic scientists, clinicians, students, technicians

September 21, 2018, Aqueous humor dynamics research at CWRU and UNMC. Imperial College, London, presented to Darryl Overby's research team of grad students.

October 1, 2018, Seminar in Physiology department at CWRU, Title: New ideas in glaucoma therapeutics, Audience: Various departments at CWRU.

Nov 14, 2018, Special lecturer, UPMC, Pittsburgh, Title: Preclinical studies of new glaucoma therapies. Audience: Basic scientists, clinicians, students, technicians

Nov 30, 2018, Seminar, Bascom Palmer, Miami University, Title: Changes in ocular fluid dynamics throughout a lifetime – Unveiling abnormal patterns from normal fluctuations. Audience: Basic

scientists, clinicians, students, technicians

Dec 8, 2018, San Diego, presentation at an invited meeting (Trabecular meshwork club) Consequence of reduced fluid flow through the trabecular meshwork. Audience: Other invited attendees in the field of trabecular meshwork research.

March 8, 2019, New Orleans, AOPT meeting. Maximizing collaboration between academia and industry (Panelists academia: Tom Yorio, Carol Toris, Iok-Hou Pang; Panelists industry: Achim Krauss, Ashwath Jayagopal)

March 9, 2019, New Orleans. How to setup and run a new lab in academic setting (Panel Leaders: Carol Toris, Christine Wildsoet and Vivian Lee)

Teaching Activities

Lectures in team-taught courses

Physiology 806, 1999 – present, 10 lectures yearly.

Somatic senses, Chemical senses, Vision, Hearing, Vestibular System

Integrative Organ and Systems Pharmacology, 2005 – present, lecture and lab.

Ocular physiology

Radiation Technology 252, 2007– present, 2 lectures yearly

Hearing and Vision

Pharmaceutical Sciences 835, 2008, 2010, 2 lectures

Physiology of the Ocular Anterior Segment, Glaucoma drugs

Advanced Neuroscience Course, 1995, 1996. Two lectures each year

Visual fields and lesions of the visual pathway

Neuroscience Core for first year medical students, 1997, 1998, 2008

Seven lectures on sensory systems

Physiology of Special Senses, Graduate Physiology Course, 1994.

Course Director

Advanced Neurophysiology Course, Physiology of the Visual System, 1996, 2004

Current Topics in Ophthalmology Basic Science (#MR-0260196), 1991-1996

Ophthalmology Residents Basic Science Teaching Program (#MR-0290199), 1992-2007

Teaching in residency programs

Current Topics in Ophthalmology Basic Science (#MR-0260196)

3 presentations/year

Ophthalmology residents' teaching program (#MR-0290199), 1992-2008

Three lectures per year

2017, September 26. Aqueous humor dynamics lecture to ophthalmology residents CWRU

CME lectures

Gifford/Truhlsen Residency Day Lectures on current topics in ophthalmic research,
Moderator, 1996-1999, 2002-2005, 2012, 2013
Nebraska Academy of Ophthalmology, 2002, 2005, 2006, one lecture each year.
Ocular anatomy, Glaucoma drugs, Aqueous humor dynamics

Graduate Students

Co-advisor for Shilpa Kaushik, graduate student in Pharmaceutical Sciences, graduated May, 1998.
Thesis title: Evaluation of in situ-forming ophthalmic drug delivery systems.

Advisor for Cassandra Hays, graduate student in Cellular and Integrative Physiology, 2011-2014

Supervisory committee for Gangadhar Sunkara, graduate student in Pharmaceutical Sciences, 2000-2002.

Supervisory committee for Narayan Cheruvu, graduate student in Pharmaceutical Sciences, 2002-2008.

Supervisory committee for Ashish Thakur, graduate student in Pharmaceutical Sciences, 2007-2011

Supervisory committee for Lili Gong, graduate student in Biochemistry, 2009-

Supervisory committee for Hiroyoshi Kawada, graduate student in Pharmaceutical Sciences, 2011-

Supervisory committee for Pallav K. Deka, Graduate student in Exercise Science, UNO. 2009

Supervisory committee for Will Lavery, Graduate student, University of Texas Health Science Center, San Antonio, TX, 2010-2012.

Prelim reviewer for Wicke Ji, Biochemistry, 2012

External reviewer for PhD defense of Theresia Carreon, (Mentor, Sanjoy Bhattacharya) Bascom Palmer, Miami, FLA, 2017

Advisor for Vikas Gulati, PhD student in Public Health, UNMC, K23 award

Other Students

Undergraduate summer research program

- 1991, Brandon Madson,
- 1991, Dora Velasquez (College of St. Mary's)
- 1992, Brandon Madson
- 2004, Tom Johnson (Northwestern)
- 2004, Lucinda Camras (Northwestern)

2004, Tiffany Harms (Nebraska Wesleyan)

2005, Tom Johnson (Northwestern)

2005, Lucinda Camras (Northwestern)

2015, Yuxi Zheng (CWRU)

2016, Ishita Gupta (CWRU)

2017 Ganiru Anunike (CWRU)

Undergraduates, mentoring:

2019, Jordan Perez (CWRU)

2019, Alexa Perez (CWRU)

2019, Kshama Girish (CWRU)

High school student:

2017-2019, Alia Baig, Hathaway Brown High School

Research internship, UNO biotech program

2006, Jan-May, Courtney Krohn

2008, Sep-Dec, Travis Lehr

B RTP students

2004 Oct-Dec, Denesha Jagers

2005 Mar.-Aug., Megan Montgomery

2011 Jan-Mar, Cassie Steiner

Medical Student research

1990 Oct-Dec, Todd Robinson

1992 Jun-Aug, Mark Tafoya

1992 Aug-Oct, Lan Nguyen

1993 Mar-July, Michele Gleason

1994 June-Aug, Corey Mayberger

1994 June-Aug, David Ball

1994 Sept-Oct, Mark Tafoya

1995 June-Aug, Sean Tarsney

1996 May-Aug, Michelle Gaffney (Creighton)

1996 May-Aug, Scott Durrett (Creighton)

1997 June, Piyush Rajurkar

1999 July, Tom Wolf

2000 July, Scott Koepsell

2000 Aug, Mike Gagnon

2002 July, Nate Haecker (Creighton)

2004 Mar, Tara Missoi

2004 May-Jun, Nathan Sneddon

2004 Aug, Michael Feilmeier

2004 Oct, Terry Huang

2004 Nov-Dec, Anya Johansen

2005 Jul-Aug, Evan Pike

2006, Jan-Dec, Ryan Basham (Creighton)

2006, Aug. Brent Timperley

2007 Jun-Jul, Christine Larsen

2007 Jul, Qui Vu (Creighton)
2007 Jun-Jul, Michelle Sudyka
2007 Sep-Oct, Evan Pike
2007 Oct, Platt Neiber
2008 May-Jul, Alex White
2008 Jun-Aug, Chiraag Gangahar.
2008 Jun-Aug, Kari Sufficool
2008 Jun-Aug, Nam Dinh (Creighton)
2009 Jul, Leigh Sutton
2009 Aug, Justin Risma
2010 Feb-Sep, Doug Dworak (Creighton)
2010 Jun-Aug, Joseph Hejkal
2010 Jun-Dec, Scott Madden
2011 Mar-May Laura Sullivan, (Creighton)
2011 Mar-May Austin Andersen (Creighton)
2011 May – July, Bret Garden, MD, PhD student
2010 Sep-2011 May and 2012, Jan, research rotation, Kingsley Okafor
2012 Jan – Sept, Nathan Harms
2012 May-Aug, Ankit Agrawal
2012 Mar-Aug, Anjulie Kelkar
2012 Sept, James Bisanti
2013, May-Aug, Nick Horan
2013, May-Aug, Bret Gardner, MD, PhD student
2013, July- 2014 March, 2015, Cybele Arsan (Creighton)
2013, Oct- 2014 March, 2015, Khoa Truong (Creighton)
2014, Jan- Jun, 2014, Michael Gilbert, (Creighton)
2018, Dec, Joshua Buzzard (CWRU)
2019, Mar, George Tye (CWRU)

Visiting Research Associates, post-doctoral fellows

2005-2006, Tom Johnson
2006-2007, Hong Liu
2007-2008, Lucinda Camras
2008-2009, Min Zhao
2008-2009, Joseph Hejkal
2009-2010, Matt Maslonka

Visiting Chinese Medical students and investigators, brief visits

2009, Sept-Oct Ying Xu (Mercury)
2010, Oct Jian Gan
2010, Oct Lu Bingwen (Willa)
2013, Jan-Feb Tao Guo

Lectures/courses at other campuses

Methods to measure aqueous humor dynamics. Statistics needed for IOP studies. Allergan, Irvine, CA, 2001

Aqueous humor dynamics and glaucoma drugs. University of Catania, Catania, Italy, 2012

Aqueous humor dynamics and prostaglandin analogs. Western University of Health Sciences, Pomona, CA, 2013

Aqueous humor dynamics and glaucoma drugs. Western University of Health Sciences, Pomona, CA, 2014

Optometry CME credits lecture, Uhhospitals, Beachwood, OH, 2015

Meeting co-organizer, Comprehensive Ophthalmology, Cleveland, Oct, 2015

Lecture to researchers at Michigan State University on measurement techniques for the study of aqueous humor dynamics in dogs.

Other teaching activities

Facilitator for Problem Based Learning, medical students, 1995-1996, UNMC

Facilitator for Integrated Clinical Experience, medical students, 1995, UNMC

Facilitator for graduate student Ethics Course, 2016-2017, CWRU