

CURRICULUM VITAE
The Johns Hopkins University School of Medicine

Allen O. Eghrari, MD, MPH

Allen Eghrari

3/30/2024

DEMOGRAPHIC AND PERSONAL INFORMATION

Current Appointments

University

7/14-3/21 Assistant Professor of Ophthalmology, Johns Hopkins University School of Medicine

4/21-present Associate Professor of Ophthalmology, Johns Hopkins University School of Medicine

Hospital

7/13-present Attending Physician, Johns Hopkins Hospital

Other

None

Personal Data

Allen O. Eghrari, MD, MPH
Wilmer Eye Institute
1800 Orleans Street
Woods 375
Baltimore, Maryland 21287
Phone: 630-706-1420 (cell)
Phone: 410-955-5490 (office)
Fax: 410-614-9172
allen@jhmi.edu

Education and Training

2004 BS, Psychology, University of Illinois at Urbana-Champaign, minor in Chemistry
2004 BA, Economics, University of Illinois at Urbana-Champaign
2009 Dean's Predoctoral Research Fellowship (Mentor: John Gottsch, MD)
2009 MD, Johns Hopkins University School of Medicine
2010 Internship, Saint Francis Hospital, Evanston, Illinois
2013 Ophthalmology Residency, Wilmer Eye Institute at Johns Hopkins Hospital
2014 Cornea and Anterior Segment Fellowship, Wilmer Eye Institute at Johns Hopkins Hospital
2018 MPH, Johns Hopkins Bloomberg School of Public Health

Professional Experience

7/13 - pres. Attending Physician, Department of Ophthalmology at Johns Hopkins Medicine
7/14 – 3/21. Assistant Professor, Department of Ophthalmology at Johns Hopkins Medicine
4/21 - pres. Associate Professor, Department of Ophthalmology at Johns Hopkins Medicine

PUBLICATIONS:

Original Research [OR]

1. Lee JK, **Eghrari AO**, Desai NR, Stark WJ, Gottsch JD. Presoaking donor corneas reduces graft detachment rates in Descemet Stripping Endothelial Keratoplasty. *Am J Ophthalmol.* 2009 Mar;147(3):439-441.e2. Role: Data analysis, manuscript writing and revision.
2. Lee JS, Desai NR, Schmidt GW, Jun AS, Schein OD, Stark WJ, **Eghrari AO**, Gottsch JD. Secondary angle closure caused by air migrating behind the pupil in Descemet stripping endothelial keratoplasty. *Cornea.* 2009 Jul;28(6):652-6. Role: Data analysis, manuscript writing and revision.

3. Riazuddin SA, **Eghrari AO**, Al-Saif A, Davey L, Meadows DN, Katsanis N, Gottsch JD. Linkage of a mild late-onset phenotype of Fuchs corneal dystrophy to a novel locus at 5q33.1-q35.2. *Invest Ophthalmol Vis Sci*. 2009 Dec;50(12):5667-71. Role: Data collection, data analysis, manuscript writing and revision.
4. Meadows DN,* **Eghrari AO**,* Riazuddin SA, Emmert DG, Katsanis N, Gottsch JD. Progression of Fuchs corneal dystrophy in a family linked to the FCD1 locus. *Invest Ophthalmol Vis Sci*. 2009 Dec;50(12):5662-6. Epub 2009 Jul 15. *For this study, I served as co-first author and developed study design, conducted data collection and analysis, and wrote and revised the manuscript.
5. Bang S, Edell E, **Eghrari AO**, Gottsch JD. Treatment with voriconazole in 3 eyes with resistant Acanthamoeba keratitis. *Am J Ophthalmol*. 2010 Jan;149(1):66-9. Role: Study design, Data collection, data analysis, manuscript writing and revision.
6. Riazuddin SA, Zaghoul NA, Al-Saif A, Davey L, Diplas BH, Meadows DN, **Eghrari AO**, Minear MA, Li YJ, Klintworth GK, Afshari N, Gregory SG, Gottsch JD, Katsanis N. Missense mutations in TCF8 cause late-onset Fuchs corneal dystrophy and interact with FCD4 on chromosome 9p. *Am J Hum Genet*. 2010 Jan;86(1):45-53. Role: Developed family pedigree, collected clinical and genetic data, conducted laboratory processing of genetic material, assisted with manuscript edits and revisions.
7. McGlumphy EJ, Yeo WS, Riazuddin SA, Al-Saif A, Wang J, **Eghrari AO**, Meadows DN, Emmert DG, Katsanis N, Gottsch JD. Age-severity relationships in families linked to FCD2 with retroillumination photography. *Invest Ophthalmol Vis Sci*. 2010 Dec;51(12):6298-302. Role: Assisted with methodology, data collection, interpretation and revisions of manuscript.
8. Riazuddin SA, Vithana EN, Seet LF, Liu Y, Al-Saif A, Koh LW, Heng YM, Aung T, Meadows DN, **Eghrari AO**, Gottsch JD, Katsanis N. Missense mutations in the sodium borate cotransporter SLC4A11 cause late-onset Fuchs corneal dystrophy. *Hum Mutat*. 2010 Nov;31(11):1261-8. Role: Assisted with developing large family pedigree, collection of genetic and clinical data, analysis and revisions of manuscript.
9. Li YJ, Minear MA, Rimmler J, Zhao B, Balajonda E, Hauser MA, Allingham RR, **Eghrari AO**, Riazuddin SA, Katsanis N, Gottsch JD, Gregory SG, Klintworth GK, Afshari NA. Replication of TCF4 through association and linkage studies in late-onset Fuchs endothelial corneal dystrophy. *PLoS One*. 2011 Apr 20;6(4):e18044. Role: Assisted with data collection, material transfer, inter-institutional collaboration, manuscript revisions.
10. **Eghrari AO**, McGlumphy EJ, Iliff BW, Wang J, Emmert D, Riazuddin SA, Katsanis N, Gottsch JD. Prevalence and severity of Fuchs Corneal Dystrophy in Tangier Island. *Am J Ophthalmol*. 2012 Jun;153(6):1067-72.
11. Demetriades AM, Leyngold IM, D'Anna S, **Eghrari AO**, Emmert DG, Grant MP, Merbs SL. Intraglandular Injection of Botulinum Toxin A Reduces Tear Production in Rabbits. *Ophthalmic Plastic and Reconstructive Surgery*. 2013 Jan;29(1):21-4. Role: assisted with data analysis.
12. Vasanth S, **Eghrari AO**, Gapsis B, Wang J, Haller NF, Stark W, Katsanis N, Riazuddin SA, Gottsch JD. Expansion of CTG18.1 Trinucleotide Repeat in TCF4 is a Potent Driver of Fuchs Corneal Dystrophy. *Invest Ophthalmol Vis Sci*. 2015 Jul 1; 56(8):4531-6. Role: Research design, data collection, data analysis, manuscript writing and revision.
13. **Eghrari AO**, Garrett BS, Mumtaz AA, Edalati AE, Meadows DN, McGlumphy EJ, Iliff BW, Gottsch JD. Retroillumination photography analysis enhances clinical definition of severe Fuchs Corneal Dystrophy. *Cornea* 2015 Dec;34(12):1623-6.
14. **Eghrari AO**, Riazuddin SA, Gottsch JD. Distinct Clinical Phenotype of Corneal Dystrophy Predicts the p.(Leu450Trp) Substitution in COL8A2. *Cornea*. 2016 May;35(5):587-91.
15. Irum B, Khan SY, Ali M, Kaul H, Kabir F, Rauf B, Fatima F, Nadeem R, Khan AO, Al Obaisi S, Naeem MA, Nasir IA, Khan SN, Husnain T, Riazuddin S, Akram J, **Eghrari AO**, Riazuddin SA. Mutation in LIM2 Is Responsible for Autosomal Recessive Congenital Cataracts. *PLoS One*. 2016 Nov 4;11(11):e0162620. Role: Assisted with clinical data interpretation, manuscript revision.
16. Irum B, Khan SY, Ali M, Daud M, Kabir F, Rauf B, Fatima F, Iqbal H, Khan AO, Al Obaisi S, Naeem MA, Nasir IA, Khan SN, Husnain T, Riazuddin S, Akram J, **Eghrari AO**, Riazuddin SA. Deletion at the GCNT2 Locus Causes Autosomal Recessive Congenital Cataracts. *Plos One* 2016 Dec 9;11(12):e0167562. Role: Assisted with clinical data interpretation, manuscript revision.
17. **Eghrari AO**, Vasanth S, Vahedi F, Riazuddin SA, Gottsch JD. CTG18.1 Expansion in TCF4 Increases Likelihood of Transplantation in Fuchs Corneal Dystrophy. *Cornea* 2017 Jan;36(1):40-43.
18. **Eghrari AO**, Mumtaz AA, Garrett BS, Rezaei M, Akhavan MS, McGlumphy EJ, Gottsch JD. Automated retroillumination photography analysis for objective assessment of Fuchs Corneal Dystrophy. *Cornea*. 2017 Jan;36(1):44-47.
19. Annadanam A, Zhao J, Wang J, **Eghrari AO**. Effects of contrast sensitivity on color vision testing. *Neuro-ophthalmology*. 2017 May 19;41(4):182-186.

20. Koo EH, **Eghrari AO**, Meshkin RS, Shi W, Feuer WJ, DeMarco KG, Kurz AC. Effects of Temperature and Fluid Media on the Scroll Width Size of the Descemet's Membrane Endothelial Keratoplasty (DMEK) Donor Graft. *Clin Ophthalmol*. 2017 Sep 1;11:1611-1615. Role: Research design, data collection, data analysis, manuscript writing and revision.
21. **Eghrari AO**, Vahedi S, Afshari N, Riazuddin SA, Gottsch JD. CTG18.1 Expansion in TCF4 among African-Americans with Fuchs Corneal Dystrophy. *Invest Ophthalmol Vis Sci*. 2017 Dec 1;58(14):6046-6049
22. **Eghrari AO**, Vasanth S, Gapsis BC, Bison H, Jurkunas U, Riazuddin SA, Gottsch JD. Identification of a Novel TCF4 Isoform in the Human Corneal Endothelium. *Cornea*. 2018 Jul;37(7):899-903.
23. Hessen MM, Vahedi S, Khoo CT, Vakili G, **Eghrari AO**. Clinical and genetic investigation of amantadine associated corneal edema. *Clin Ophthalmol*. 2018 Aug 6;12:1367-1371.
24. Reed NS, Deal JA, Huddle MG, Betz JF, Bailey BE, McGlumphy EJ, **Eghrari AO**, Riazuddin SA, Lin FR, Gottsch JD. Pilot Study of Audiometric Patterns in Fuchs Corneal Dystrophy. *J Speech Lang Hear Res*. 2018 Oct 26;61(10):2604-2608. Role: data collection and interpretation, manuscript revision.
25. Lohmeier J, Christy J, Chiang E, Barnes K, Cai S, Chen C, Subramanya A, Chaurasia A, Rosen A, Vora P, Durr NJ, Allen R **Eghrari AO**. Viability of Descemet membrane endothelial keratoplasty grafts folded in the eye bank. *Cornea*. 2018 Nov;37(11):1474-1477.
26. Zhao J, Fliotsos M, Ighani M, **Eghrari AO**. Comparison of a Smartphone Application with Ishihara Pseudoisochromatic Plate for Testing Colour Vision. *Neuroophthalmology*. 2018 Nov 19;43(4):235-239.
27. Ji Y, Hu K, Li C, Li P, Kijlstra A, **Eghrari AO**, Lei B, Du L, Wan W, Yang P. Outcome and prognostic factors of phacoemulsification cataract surgery in Vogt-Koyanagi-Harada uveitis. *Am J Ophthalmol*. 2018 Dec;196:121-128. Role: Research design, data interpretation, manuscript revision.
28. Barnes K, Chiang E, Chen C, Lohmeier J, Christy J, Cai S, Subramanya A, Chaurasia A, Rosen A, Vora P, Durr NJ, Allen R, **Eghrari AO**. Comparison of tri-folded and scroll-based graft viability in preloaded Descemet Membrane Endothelial Keratoplasty. *Cornea*. 2019 Mar;38(3):392-396.
29. Sneller MC, Reilly C, Badio M, Bishop RJ, **Eghrari AO**, Moses SJ, Johnson KL, Gayedyu-Dennis D, Hensley LE, Higgs ES, Nath A, Tuznik K, Varughese J, Jensen KS, Dighero-Kemp B, Neaton JD, Lane HC, Fallah MP for the PREVAIL III Study Group. A Longitudinal Study of Ebola Sequelae in Liberia. *N Engl J Med*. 2019 Mar 7;380(10):924-934.
This paper, from the largest study of post-Ebola syndrome and the only one with serology-proven controls, offers some of the closest insights we have to date into the nature of this disease relative to a local population. Altmetric places it at the 99th percentile for research outputs of the same age, and at the 89th percentile for outputs from the New England Journal of Medicine. Together with co-lead eye investigator, contributed ophthalmology component, revealing uveitis in a quarter of people who survived Ebola virus. This included study design, data collection, data analysis and interpretation, and contributing toward the manuscript.
30. Karakus S, Ighani M, Noparat P, Tofigh M, Chiang E, Barnes K, Chen CY, Liu T, **Eghrari AO**. Aspiration of tri-folded, endothelium-in grafts for Descemet Membrane Endothelial Keratoplasty. *Cornea*. 2019 May;38(5):654-657.
31. Abt NB, Zhao J, Huang Y, **Eghrari AO**. Prognostic factors and survival for malignant conjunctival melanoma and squamous cell carcinoma over four decades. *Am J Otolaryngol*. 2019 Jul-Aug;40(4):577-582.
32. Ighani M, Karakus S, **Eghrari AO**. Clinical Outcomes of Descemet Membrane Endothelial Keratoplasty Using the Bonfadini-Todd Injector for Graft Insertion. *Clin Ophthalmol*. 2019 Sep 20;13:1869-1876.
33. Zhao J, Huang AH, Rainer BM, Kryatova MS, **Eghrari AO**, Wang J, Puttgen KB, Cohen BA. Periocular infantile hemangiomas: characteristics, ocular sequelae, and outcomes. *Pediatr Dermatol*. 2019 Nov;36(6):830-834. Role: clinical data interpretation, manuscript revisions.
34. Vizcaino MA, Tabbarah AZ, Asnaghi L, Maktabi A, **Eghrari AO**, Srikumaran D, Eberhart CG, Rodriguez FJ. ADAM3A copy number gains occur in a subset of conjunctival squamous cell carcinoma and its high grade precursors. *Hum Pathol*. 2019 Dec;94:92-97. Role: data collection, revision of manuscript.
35. Koo EH, Pineda R, Afshari N, **Eghrari A**. Learning Descemet Membrane Endothelial Keratoplasty: A Survey of U.S. Corneal Surgeons. *Cornea* 2020 May;39(5):590-593.
36. Fliotsos MJ, Deljookorani S, Dzhaber D, Chandan S, Ighani M, **Eghrari AO**. Qualitative and Quantitative Analysis of the Corneal Endothelium with Smartphone Specular Microscopy. *Cornea*. 2020 Jul;39(7):924-929.
37. Solar SJ, Deljookorani S, Wiener BG, Rosen A, Chaurasia A, Shahmirzadi M, Meshkin RS, Dzhaber D, Chiang E, Barnes K, Chen CY, Koo E, **Eghrari AO**. Preloading tri-folded grafts for Descemet membrane endothelial keratoplasty affects scroll formation. *Cornea*. 2020 Aug;39(8):1062-1065.
38. **Eghrari AO**, Rasooly MM, Fliotsos MJ, Kinard J, Odozor O, Bishop RJ, Cunningham D, Guerrerio A, Frischmeyer-Guerrerio P. Corneal thinning and cornea guttata in patients with mutations in TGFB2. *Can J Ophthalmol*. 2020 Aug;55(4):336-341.

39. Fliotsos MJ, Zhao J, Pradeep T, Ighani M, **Eghrari AO**. Testing a Popular Smartphone Application for Colour Vision Assessment in Healthy Volunteer Subjects. *Neuro-ophthalmology* 2020 Oct 06.
40. **Eghrari AO**, Bishop RJ, Ross RD, Davis B, Larbelee J, Amegashie F, Dolo RF, Prakalapakorn G, Gaisie C, Gargu C, Sosu Y, Sackor J, Cooper PZ, Wallace A, Burkholder B, Brady CJ, Ray V, Tawse KL, Yeung I, Neaton JD, Higgs ES, Lane HC, Reilly C, Sneller MC, Fallah MP. Characterization of Ebola eye disease. *JAMA Network Open*, 2021;4(1):e2032216.
This manuscript compares eye findings in Ebola survivors and their close contacts in Liberia, and demonstrates significant ocular sequelae even at an average of one year after infection. Over 1000 participants contributed to these baseline findings in the five-year, longitudinal cohort study (PREVAIL III).
41. Ighani M, Dzhabber D, Jain S, De Rojas JO, **Eghrari AO**. Techniques, outcomes and complications of pre-loaded, tri-folded Descemet membrane endothelial keratoplasty using the DMEK EndoGlide. *Cornea*, 2021; Jan 18 (e-print).
42. **Eghrari AO**, Shanta JG, Ross RD, Van Ryn C, Crozier I, Hayek B, Gradin D, Roberts B, Prakalapakorn SG, Amegashie F, Nishant K, Singh G, Dolo R, Fankhauser J, Burkholder B, Pettitt J, Gross R, Brady T, Dighero-Kemp B, Reilly C, Hensley L, Higgs E, Yeh S, Bishop RJ. Efficacy and Safety Outcomes of Cataract Surgery in Survivors of Ebola Virus Disease: 12-month Results from the PREVAIL VII Study. *Trans. Vis. Sci. Tech.* 2021;10(1):32.
43. Bajaj RP, Fliotsos MJ, Pradeep T, **Eghrari AO**. Peripheral-to-central ratio of Guttae: validity and reliability of an objective method to characterize severity of Fuchs endothelial corneal dystrophy. *Graefes Arch Clin Exp Ophthalmol.* 2021 Mar;259(3):685-690.
44. Chen C, Solar SJ, Lohmeier J, Terrin S, Baliga S, Wiener BG, Lewis DS, Chiang E, Barnes K, Chaurasia A, **Eghrari AO**. Viability of Preloaded Descemet Membrane Endothelial Keratoplasty Grafts with 96-Hour Shipment. *BMJ Open Ophthalmology* 2021;6:e000679.
45. Shah K, **Eghrari AO**, Vanner EA, O'Brien TP, Koo EH. Scheimpflug Corneal Densitometry Values and Severity of Guttae in Relation to Visual Acuity in Fuchs Endothelial Corneal Dystrophy. *Cornea.* 2022 Jun 1;41(6):692-698. Co-developed study design, co-wrote manuscript.
46. Koo EH, **Eghrari AO**, Dzhabber D, Shah A, Fout E, Dubovy S, Maestre-Mesa J, Miller D. Presence of SARS-CoV-2 Viral RNA in Aqueous Humor of Asymptomatic Individuals. *Am J Ophthalmol.* 2021 Oct;230:151-155.*Co-first authors
47. Karmakar R, Nooshabadi S, **Eghrari A**. An automatic approach for cell detection and segmentation of corneal endothelium in specular microscope. *Graefes Arch Clin Exp Ophthalmol.* 2022 Apr;260(4):1215-1224. doi: 10.1007/s00417-021-05483-8.
48. Koo EH, Bolton EM, Vanner EA, **Eghrari AO**, Donaldson KE. Outcomes of Femtosecond Laser-Assisted Cataract Surgery Compared to Conventional Phacoemulsification in Eyes with Pseudoexfoliation Syndrome. *Semin Ophthalmol.* 2022 Jul 4;37(5):631-636. PMID: 35345981. Contributed to data analysis and manuscript writing.
49. Mudalegundi S, Ross RD, Larbelee J, Amegashie F, Dolo RF, Prakalapakorn GS, Ray V, Gargu C, Sosu Y, Sackor J, Cooper PZ, Wallace A, Nyain R, Burkholder B, Van Ryn C, Davis B, Fallah MP, Reilly C, Bishop RJ, **Eghrari AO**. Long-term decrease in intraocular pressure in survivors of Ebola virus disease in the PREVAIL III Study. *Ophthalmol Sci.* 2022 Nov 4;3(2):100238.
50. Heckenlaible NJ, Dun C, Prescott C, **Eghrari AO**, Woreta F, Makary MA, Srikumaran D. Predictors of Receiving Keratoplasty for Fuchs' Endothelial Corneal Dystrophy among Medicare Beneficiaries. *Ophthalmology.* 2023 Jan;130(1):28-38. PMID: 35932840. Contributed to interpretation of data and manuscript writing.
51. Karmakar R, Lohmeier J, Terrin S, Nooshabadi S, **Eghrari AO**. Alcohol abuse is associated with alterations in corneal endothelial morphology. *Cornea.* 2023 Apr 1;42(4):444-448.
Featured in the Ophthalmology Times, this article drew on data from over 5000 cornea donors to show that heavy alcohol use is associated with decreased endothelial cell density. Altmetric ranks it #1 among 34 articles in Cornea of the same age.
52. Karmakar R, Nooshabadi S, **Eghrari AO**. Mobile Cell-Net: Automatic segmentation of corneal endothelium using an efficient hybrid deep learning model. *Cornea.* 2023 Apr 1;42(4):456-463.
53. Rowhani-Farid A, Grewal M, Solar S, **Eghrari AO**, Zhang AD, Gross CP, Krumholz HM, Ross JS. Clinical trial data sharing: a cross-sectional study of outcomes associated with two U.S. National Institutes of Health models. *Sci Data.* 2023 Aug 8;10(1):529.
54. Rocher EE, Mukherjee R, Pitingolo J, Levenshus E, Alexander G, Park M, Acharya R, Khan S, Shuff J, Aguirre A, Matin S, Walter K, **Eghrari AO**. Intraocular Lens Unfurling Time Exponentially Decays with Increased Solution Temperature. *Clin Ophthalmol.* 2023 Aug 21;17:2471-2481.
55. Petithomme R, Karmakar R, Lohmeier J, Terrin S, Koo EH, **Eghrari AO**. Comparison of corneal endothelial cell density and morphology with Optisol GS and Life4C storage media in the eye bank: a 5-year retrospective analysis. *Eye Banking and Cornea Transplantation.* 2023 Dec;2(4):e0019. <http://dx.doi.org/10.1097/ebct.0000000000000019>

56. Huertas-Bello M, Seery CW, Sem K, Fout E, Triglia C, **Eghrari AO**, Koo EH. Effect of Anterior Chamber Air on Central Corneal Thickness in Human Donor Eyes. *Cornea*. 2023 Dec 20. doi: 10.1097/ICO.0000000000003457. Epub ahead of print. PMID: 38128101. Contributed toward conceptualization and planning of experiment, analysis of data, and writing of manuscript.
57. **Barclay KS**, You JY, Coleman MJ, Mathews PM, Ray VL, Riaz KM, De Rojas JO, Wang AS, Watson SH, Koo EH, **Eghrari AO**. Quality and Agreement With Scientific Consensus of ChatGPT Information Regarding Corneal Transplantation and Fuchs Dystrophy. *Cornea*. 2023 Nov 28. doi: 10.1097/ICO.0000000000003439. Epub ahead of print. PMID: 38016014.
58. Sachdeva MM, Lee Y, Unlu EK, Koseoglu ND, Cha E, Wang J, Prescott CR, **Eghrari AO**, Na CH. Tandem Mass Tag LC-MS/MS of Aqueous Humor From Individuals With Type 2 Diabetes Without Retinopathy Reveals Early Dysregulation of Synaptic Proteins. *Invest Ophthalmol Vis Sci*. 2024 Mar 5;65(3):16. Contributed towards planning, data collection, interpretation of results and manuscript preparation.

Review Articles [RA]

1. **Eghrari AO**, Daoud YJ, Gottsch JD. Cataract surgery in Fuchs corneal dystrophy. *Curr Opin Ophthalmol*. 2010 Jan;21(1):15-9.
2. **Eghrari AO**, Gottsch JD. Fuchs' corneal dystrophy. *Expert Rev Ophthalmol*. 2010 Apr;5(2):147-159.
3. **Eghrari AO**, Riazuddin SA, Gottsch JD. Overview of the Cornea: Structure, Function, and Development. *Prog Mol Biol Transl Sci*. 2015;134:7-23.
This review provides an overview of the molecular biology of the cornea and has been cited over 300 times in the literature, according to Google Scholar.
4. **Eghrari AO**, Riazuddin SA, Gottsch JD. Fuchs Corneal Dystrophy. *Prog Mol Biol Transl Sci*. 2015;134:79-97

Case Reports [CR]

1. Wubben TJ, **Eghrari AO**, McCoy AN, Ramsey DJ. Optic Atrophy in End-Stage Giant Axonal Neuropathy: A Case Report. *Neuro-Ophthalmology*. 2013 Oct;37(5):209-213. Role: Manuscript planning, data collection and analysis, manuscript revision.
2. **Eghrari AO**, Rivers R, Alkharashi M, Rajaii F, Nyhan D, Sikder S. Cataract surgery in patients with left ventricular assist device support. *Journal of Cataract and Refractive Surgery*. 2014 Apr;40(4):675-8.
3. **Eghrari AO**, Gibas CG, Watkins T, Vahedi S, Lee R, Houle E, Suarez MJ, Eberhart C, Sutton D, Wiederhold N, Sikder S, Zhang SX. First Human Case of Fungal Keratitis Caused by a Putatively Novel Species of *Lophotrichus*. *Journal of Clinical Microbiology*. 2015 Jun;53:3063-3067.
4. **Eghrari AO**, Ahmad S, Ramulu P, Iliff NT, Akpek EK. The Usage of a Conjunctival Flap to Improve Retention of Boston Type 1 Keratoprosthesis in Severe Ocular Surface Disease. *Ocul Immunol Inflamm*. 2016 Oct;24(5):555-60.
5. Karakus S, Gottsch JD, Caturegli P, **Eghrari AO**. Monoclonal gammopathy of "ocular" significance. *Am J Ophthalmol Case Rep*. 2019 May 20;15:100471.
6. Armour MD, Askew TE, **Eghrari AO**. Endothelial keratoplasty for corneal endothelial dystrophy in a dog. *Veterinary Ophthalmology* 2019;Jul;22(4):545-551.
7. Abousy M, Bohm K, Prescott C, Bonsack JM, Rowhani-Farid A, **Eghrari AO**. Bilateral EK Rejection After COVID-19 Vaccine. *Eye Contact Lens*. 2021 Nov 1;47(11):625-628.
This article highlighted the risk of corneal graft rejection after vaccination for SARS-CoV-2. According to Altmetric, the attention it has received ranks it above the 99th percentile for this journal, among the top 10 articles of over 700 that it has published.
8. Dzhaber D, Fliotsos MJ, Abousy M, Kancherla S, Siadati S, Eberhart CG, Gottsch JD, **Eghrari AO**. Descemet membrane endothelial keratoplasty in eyes with COL8A2-associated corneal dystrophy. *Am J Ophthalmol Case Rep*. 2022 Apr 27;26:101544.
9. Chen CY, Solar SJ, Lewis DS, Barnes K, Wiener BG, Baliga S, Chiang E, Askew TE, **Eghrari AO**,* Armour MD.* Canine Descemet Stripping Endothelial Keratoplasty with a Tissue Insertion Device: Technique and Long-Term Outcome. *Case Rep Vet Med*. 2023 Dec 21;2023:7497643. doi: 10.1155/2023/7497643. PMID: 38155859; PMCID: PMC10754630. (*Equal senior authors)

Book Chapters, Monographs [BC]

1. **Eghrari AO**, Newman-Toker D. "Neurology." In *First Aid for the USMLE Step 2 CK*. 2009, 7th edition. Le, Bhushan, Bagga, editors. 279-318.

2. **Eghrari AO**. "Epidemiology and Biostatistics." In *First Aid for the USMLE Step 2 CK*. 2009, 7th edition. Le, Bhushan, Bagga, editors. 131-144.
3. **Eghrari AO**. "Ethics and Legal Issues." In *First Aid for the USMLE Step 2 CK*. 2009, 7th edition. Le, Bhushan, Bagga, editors. 145-150.
4. Contributing Author, *First Aid Q & A for the USMLE Step 1*. 2009, 2nd edition. Le, Bechis, editors.
5. **Eghrari A**. "Fuchs Dystrophy Disease." In: Schmidt-Erfurth U., Kohnen T. (eds) *Encyclopedia of Ophthalmology*. Springer, Berlin, Heidelberg. 2013.
This comprehensive text sought to become an overarching resource in the field with 1124 entries covering all of ophthalmology. Authored or co-authored approximately 1 in 40 entries in the book, for a total of 28 entries, including the above.
6. **Eghrari AO**, Gottsch JD. "Molecular Genetics of Corneal Diseases." In *Cornea*, 4e. Mannis and Holland, eds. 2016. 132-143.
7. Shan A, Bicket A, **Eghrari AO**. "Ultrasonography of the Anterior Segment." In *Ophthalmic Ultrasound*, 3rd ed. Aranow M, ed. In press.
8. **Eghrari AO**, Gottsch JD. "Molecular Genetics of Corneal Diseases." In *Cornea*, 5e. Mannis and Holland, eds. In press.
9. Fliotsos MJ, **Eghrari AO**. "Pathology of the endothelium." In *A Clinical Atlas of Anterior Segment Ocular Coherence Tomography*. Levinson B and Woreta F, eds. In press.

Books, Textbooks [BK]

None

Other Publications:

Proceedings Reports [PR]

1. Bishop RJ, **Eghrari AO**. "Eye disease in EVD Survivors in Liberia (PREVAIL III Study)." WHO Meeting on Survivors of Ebola Virus Disease: Clinical Care of Survivors. Meeting Report, Freetown, Sierra Leone, 3-4 August 2015.

Editorials [ED]

1. Brady CJ, **Eghrari AO**, Labrique AB. Smartphone-Based Visual Acuity Measurement for Screening and Clinical Assessment. *JAMA*. 2015 Dec;314(24):2682-3.
Co-wrote editorial regarding smartphones in ophthalmology. Altmetric places this among the top 5% of all research outputs and 94th percentile for outputs of the same age. This piece received higher attention than 73% of all outputs from JAMA.
2. **Eghrari AO**. Artificial intelligence, medical knowledge, and empowering patients. *Mayo Clinic Proceedings: Digital Health*. 2024 Feb;2(1):160-162.

Methods and Techniques [MT]

1. Wang A, Christoff A, Guyton DL, Repka MX, Rezaei M, **Eghrari AO**. Google Glass Indirect Ophthalmoscopy. *Journal of Mobile Technology in Medicine*, 2015 Jan; 4(1):15-18.
2. Vahedi M, Davis G, Coleman MJ, Garrett B, **Eghrari AO**. Smartphone-based video of Demodex folliculorum in biopsied human eyelash follicles. *Med Hypothesis Discov Innov Ophthalmol*. 2015;4(2):36-8.
3. **Eghrari AO**, Wang A, Brady CJ. Google Cardboard Indirect Ophthalmoscopy. *Retina*. 2017 Aug;37(8):1617-1619.
In this paper, we demonstrated how indirect ophthalmoscopy can be conducted using ubiquitous tools such as a smartphone and cardboard. According to Altmetric, the attention received by this paper is in the top 3% of all research outputs tracked from the journal Retina.
4. Chiang E, Chen C, Barnes K, Chaurasia A, Rosen A, Solar S, Wiener B, Cai S, Subramanya A, Vora P, Durr NJ, **Eghrari AO**, Allen R. A Device for Preloaded, Trifolded Grafts to Facilitate Descemet Membrane Endothelial Keratoplasty. *J. Med. Devices*. Dec 2019, 13(4): 044502. *Role: Study design, data collection and interpretation, manuscript revision and acceptance.*
5. Shekhawat NS, Kaur B, Edalati A, Abousy M, **Eghrari AO**. Tenon patch graft with vascularized conjunctival flap for management of corneal perforation, *Cornea*. 2022 Nov 1;41(11):1465-1470.
6. Li G, Shekhawat NS, **Eghrari AO**. Sutured Descemet Membrane Endothelial Keratoplasty in Patients with Complex Anatomy or Difficulty Positioning. *Cornea*. 2023 Mar 1;42(3):389-394.

Media Releases or Interviews [MR]

10/20/14 “Allen Eghrari MD joins the medical faculty of the Johns Hopkins Wilmer Eye Institute.” <http://www.baltimoresun.com/health/maryland-health/bal-ugc-photo-allen-eghrari-md-joins-the-medical-facult-2014-10-20-photo.html>

7/10/15 “Ebola Research efforts shift to improving survivors’ health.” Interview with Baltimore Sun. <http://www.baltimoresun.com/health/maryland-health/bs-hs-ebola-survivors-20150710-story.html>

9/8/15 NEI Team in Liberia Investigates Ocular Effects Among Ebola Survivors.. https://nei.nih.gov/news/briefs/nei_team_in_liberia

2/25/16 Ebola’s ghost: the mystery after the outbreak. Feature article in *Wired UK*. <http://www.wired.co.uk/news/archive/2016-02/25/post-ebola-syndrome>
For this article, the author and photographer came from the United Kingdom to spend time with us in the field, getting to know staff, colleagues and patients both in clinic and in their homes. It offers some insight into the personal stories and human beings behind the numbers.

4/28/17 “Johns Hopkins team takes second in business plan competition with corneal surgery enhancement” <https://hub.jhu.edu/2017/04/28/treyetech-team-values-ventures-business-competition/>

5/1/17 “Ebola and Zika: what we know so far.” EyeNet. American Academy of Ophthalmology. May 2017. <https://www.aao.org/eyenet/article/emerging-viral-infections?may-2017>. Cover story.

1/4/18 “PREVAIL, Partners Perform 40 Successful Cataract Eye Surgeries” Front page article in *Front Page Africa*. <https://frontpageafricaonline.com/health/prevail-partners-perform-40-successful-cataract-eye-surgeries/>

5/23/18 These Johns Hopkins students worked with docs to improve eye surgery — and then started a company_ Baltimore Business Journal. <https://www.bizjournals.com/baltimore/news/2018/05/23/these-johns-hopkins-students-worked-with-docs-to.html>

9/21/18 Johns Hopkins Team ‘Treyetech’ Wins Lemelson-MIT Student Prize, Honoring Student Inventors. *IndiaWest*. https://www.indiawest.com/news/global_indian/johns-hopkins-team-treyetech-wins-lemelson-mit-student-prize-honoring/article_19f01d32-bdc7-11e8-93f2-3b38d0241dbc.html

5/16/19 “JHU-born Treyetech picks up \$30K at prominent business plan competition.” Technical.ly Baltimore. <https://technical.ly/baltimore/2019/05/16/jhu-born-treyetech-picks-up-30k-at-prominent-business-plan-competition/>

9/11/19 “Praktik Cangkok Kornea Mata, Dokter RSUP Sanglah Pakai Mata Babi.” Bali Express. <https://baliexpress.jawapos.com/read/2019/09/11/155336/praktik-cangkok-kornea-mata-dokter-rsup-sanglah-pakai-mata-babi>. Newspaper article in Bali Express described our educational course teaching cornea transplantation.

11/12/19 “40 Under 40 2019: Dr. Allen Eghrari, Johns Hopkins University School of Medicine” <https://www.bizjournals.com/baltimore/c/meet-the-baltimore-business-journals40-under-40/11106/40-under-40-2019-dr-allen-eghrari-johns-hopkins-university-school-of-medicine.html>

7/14/20 “A solution to vision loss in canines.” <https://www.bme.jhu.edu/news-events/news/a-solution-to-vision-loss-in-canines/>

Other Media (Videos, Websites, Blogs, Social Media, etc.) [OM]

1. Youtube video on Descemet Membrane Endothelial Keratoplasty: https://www.youtube.com/watch?v=bY3o_6gp3JU
2. Youtube JHMI video - Dr. Allen Eghrari – 1K+ views <https://www.youtube.com/watch?v=WlZxaZ0SkOQ&t=2s>
3. Co-authored by invitation the Fuchs’ Endothelial Dystrophy chapter in *EyeWiki*, the American Academy of Ophthalmology-sponsored online resource for accurate, publicly available information on ocular conditions. December 2022.

FUNDING

EXTRAMURAL Funding

Research Extramural Funding

- 7/1/22 – 6/30/23 Artificial Intelligence-based Deep Learning algorithm to analyze endothelial cell density and quality of human donor cornea
Eye Bank Association of America Pilot Research Grant
Role: Co-Investigator
- 12/19/22 - 8/18/23 Bilateral Corneal Symmetry 3-D Analyzer
TEDCO / Maryland Innovation Initiative
Role: Co-Investigator, JHU PI, 10% effort
- 8/15/21-01/31/22 Image processing software and slit lamp device for use in optometry
NSF Grant 2143608: Innovation Corps
Sponsor: National Science Foundation
Role: Technical Lead
- 7/1/18-12/31/20 Clinical and Genetic Characterization of Fuchs Dystrophy in African Americans
Research to Prevent Blindness Sybil B. Harrington Special Scholar Award
Sponsor: Research to Prevent Blindness
Principal Investigator
- 9/1/14-8/31/18 Characterization of Fuchs Corneal Dystrophy in African-Americans
NIH K12 EY015025-10 Mentored Clinical Scientist Training Grant
Sponsor: National Eye Institute
Mentors: John Gottsch, MD and Alfred Sommer, MD, MHS
- 7/1/14-7/1/16,
7/16-7/17 (renewed)
7/17-7/18 (renewed) Characterization of Fuchs Corneal Dystrophy in African-Americans
NIH L30 EY024746 Clinical Scientist Loan Repayment Grant
Sponsor: National Eye Institute
Principal Investigator
- 7/16-7/17 Cataract Surgical Outcomes in Ebola Virus Disease
American Society of Cataract and Refractive Surgeons Foundation Grant #125296
Sponsor: American Society of Cataract and Refractive Surgery
Principal Investigator: Allen Eghrari, MD
- 7/17-7/18 A novel DMEK insertion device
American Society of Cataract and Refractive Surgeons Foundation Grant
Sponsor: American Society of Cataract and Refractive Surgery
Principal Investigator: Aaron Wang, MD, PhD
Role: Co-Investigator

Educational Extramural Funding

None

Clinical Extramural Funding

None

System Innovation or Quality Improvement Extramural Funding

None

Other Extramural Funding, including philanthropy

2018-present Funding for Building Eye Care Abroad

Philanthropic Support from Tolsma Family Foundation

INTRAMURAL FUNDING

Research Intramural Funding

Current

None

Pending

None

Previous

10/10-7/11

Title: Fuchs Corneal Dystrophy in Tangier Island
A. Edward Maumenee Research Grant Award
Sponsor: Wilmer Eye Institute at Johns Hopkins
Direct costs: \$2000

10/12-7/13

Title: Anatomic Variants in Fuchs Corneal Dystrophy
Fuchs Corneal Dystrophy Research Grant Award
Sponsor: Wilmer Eye Institute at Johns Hopkins
Role: Principal investigator

10/13-7/14

Title: Refractive Changes in Fuchs Dystrophy
Wilmer Eye Institute Research Grant Award
Sponsor: Wilmer Eye Institute at Johns Hopkins
Role: Principal investigator

12/14-5/15

Title: Ocular Pathology in Ebola Virus Disease
Support from Department of Ophthalmology to initiate study of Ebola eye disease
Sponsor: Wilmer Eye Institute at Johns Hopkins
Role: Principal Investigator
This support allowed me to initiate my work with Ebola Eye Disease in Liberia.

Pending

None

Educational Intramural Funding

None

Clinical Intramural Funding

None

System Innovation or Quality Improvement Intramural Funding

None

Other Intramural Funding

None

CLINICAL ACTIVITIES

Clinical Focus

As an ophthalmologist with specialization in Cornea, my clinical focuses encompass two areas: endothelial dystrophies and Ebola eye disease. For the former, I am working to develop diagnostic imaging techniques to diagnose and characterize severity of Fuchs dystrophy, enhance surgical approaches including Descemet membrane endothelial keratoplasty, and build canine endothelial keratoplasty. To build knowledge about and address Ebola eye disease, we have together with

collaborators developed an advanced clinic in Liberia for people who survived Ebola virus disease to learn about their eyes and what can be done to address the needs that have arisen from viral infection.

Certification

Medical, other state/government licensure

2013-pres. Maryland Board of Physicians, D0076029
2015-pres. Liberia Medical Council

Boards, other specialty certification

1/13 Endo Optiks Endocyclophotocoagulation Certification
8/13 VISX Certification, Johns Hopkins at Greenspring
3/14 STAAR Visian Implantable Collamer Lens Certification
6/16 American Board of Ophthalmology

Clinical (Service) Responsibilities

7/13-7/14 Cornea and Anterior Segment Fellowship, Wilmer Eye Institute
Advanced Specialty Training Program Attending and Fellow
11/13-pres. Attending Physician, Wilmer Eye Institute at Bel Air
3/14-7/14 Ophthalmology Consultant, Emergency Department at Johns Hopkins, 4hrs/week
7/14-pres. Assistant Professor, Cornea and Anterior Segment Service, Wilmer Eye Institute
6/15-6/20 Co-Chief Ophthalmologist, PREVAIL III Clinic, Monrovia, Liberia

Clinical Productivity

We average approximately 10,000 RVUs yearly in clinical productivity.

Clinical Draw from outside local/regional area

2017-present Among DMEK procedures performed 2017-2020, 39% have been from out of state or country.

Membership in or examiner for specialty board

None

Clinical Program Building / Leadership

6/15-6/20 Co-director of the PREVAIL eye clinic in JFK hospital in Monrovia, Liberia. With NIH support, we established a clinical space for diagnosis and treatment of Ebola-associated eye disease. Over a five-year period, together with three ophthalmologists and two cataract nurses from Liberia, we examined over 1000 Ebola survivors and 2000 close contacts in this clinic.

6/17-present Collaborated with Dr. Micki Armour, veterinary ophthalmologist, to perform the first endothelial keratoplasty to reverse blindness from canine endothelial dystrophy, a cause of vision loss common in Boston Terriers, Chihuahuas and Dachshunds. Over time, we have refined the technique, developed dedicated tools, and organized courses to share knowledge with doctors from six countries about how to perform this surgery and restore vision for dogs.

Clinical Demonstration Activities to external audience, on or off campus

7/15 Interpretation of Optical Coherence Tomography, lessons given to ophthalmologists and nurses at JFK Hospital, Monrovia, Liberia
10/15/16 Descemet Membrane Endothelial Keratoplasty (DMEK) – faculty at transplant course at American Academy of Ophthalmology organized by Tissue Banks International.
6/17 Observership, Dr. Zanatta from Argentina, in clinic and operating room
7/19 Observership, Dr. Kiry from Cambodia, in clinic and operating room
2/23 Vision screening and cataract diagnosis in Tanna, Vanuatu in Namasmatene
2/24 Corneal examination teaching in Port Vila, Vanuatu at the Vanuatu Eye Centre
2/24 Vision screening and cataract diagnosis in Tanna, Vanuatu in Namasmatene

Development of national or internationally recognized clinical standard of care documents

8/15 Co-authored eye section of clinical standard of care document produced by WHO for management of Ebola-associated sequelae:
(http://apps.who.int/iris/bitstream/10665/204235/1/WHO_EVD_OHE_PED_16.1_eng.pdf).
In 2015, little was known about Ebola eye disease. My collaborator and I were asked to help write the section on management of eye disease in the setting of Ebola virus.

EDUCATIONAL ACTIVITIES

Educational Focus

My educational efforts focus in two areas: building capacity to perform corneal and cataract surgery and building capacity to perform clinical research. With the former, we are developing educational tools including courses, videos, lectures, and personal mentoring in surgery both here and abroad, in both the human and veterinary fields, and I serve as a primary faculty member for our cornea fellowship. With the latter, we collaborate with nurses and doctors in Liberia to build capacity for clinical research, to investigate and address health challenges that may arise.

Teaching

Classroom instruction

JHMI/Regional

7/2/14 Lecturer, Ophthalmology Residents, “Red Eye,” Wilmer Eye Institute at Johns Hopkins.
7/23/14 Lecturer, Ophthalmology Residents, “Ocular Biometry.” Wilmer Eye Institute at Johns Hopkins
8/28/14 Lecturer, Ophthalmology Residents, “Developmental and Metabolic Corneal Disorders.” Wilmer Eye Institute at Johns Hopkins
10/16/14 Lecturer, Ophthalmology Residents, “Techniques in Corneal Surgery.” Wilmer Eye Institute at Johns Hopkins
2/10/15 Journal Club Faculty, Wilmer Eye Institute Fellows and Residents, “Ultrathin Descemet stripping automated endothelial keratoplasty.” Wilmer Eye Institute at Johns Hopkins
7/2/15 Lecturer, Ophthalmology Residents, “Red Eye: Common Ophthalmic Emergencies.” Wilmer Eye Institute at Johns Hopkins
9/17/15 Lecturer, Learner level: ophthalmic technicians, “Ebola and the Eyes.” Wilmer Eye Institute at Bel Air.
12/15 Lecturer, Ophthalmology Residents, “Ocular Biometry.” Wilmer Eye Institute at Johns Hopkins
5/16 Faculty organizer, Johns Hopkins medical students, “Emerging Infectious Diseases: Global Blindness Symposium,” Johns Hopkins University School of Medicine. Worked with 4 students to organize lecture for 120 first-year medical students at Johns Hopkins University School of Medicine.
7/7/16 Lecturer, Ophthalmology Residents, “Red Eye.”
9/8/16 Lecturer, Ophthalmology Residents, “Ocular Biometry.”
11/8/16 Lecturer, Public Health Graduate Students, “Ebola and Zika: Emerging Infectious Diseases.” in Epidemiology of Eye Disease Course, Johns Hopkins Bloomberg School of Public Health.
5/24/17 Faculty organizer, Johns Hopkins medical students, “Global Blindness Symposium,” Johns Hopkins University School of Medicine. Worked with 4 students to organize lecture for 120 first-year medical students at Johns Hopkins University School of Medicine.
10/31/17 Lecturer, Public Health Graduate Students, 340.640.01 Eye Disease: Epidemiology and Control, Johns Hopkins Bloomberg School of Public Health. Lectured regarding Ebola Eye Disease.
1/25/18 Lecturer, Ophthalmology Residents, “Fuchs Dystrophy and Corneal Transplantation.” Wilmer Eye Institute at Johns Hopkins
5/18 Faculty organizer, Johns Hopkins medical students, “Global Blindness Symposium,” Johns Hopkins University School of Medicine. Worked with 4 students to organize lecture for 120 first-year medical students at Johns Hopkins University School of Medicine.
5/17/18 Lecturer, Wilmer Eye Institute at Johns Hopkins Surgical Nurses, “Cornea Transplantation.” Delivered to nurses in Smith Building at all-nurses meeting.
12/20/18 Lecturer, Public Health Graduate Students, Epidemiology of Eye Disease, Johns Hopkins Bloomberg School of Public Health. Lectured regarding Ebola Eye Disease.
5/19 Faculty organizer, Johns Hopkins medical students, “Global Blindness Symposium,” Johns Hopkins University School of Medicine. Worked with 4 students to organize lecture for 120 first-year medical students at Johns Hopkins University School of Medicine.

6/19-6/21 Course Director, Johns Hopkins Medical Student Elective, "Clinical Elective in Ophthalmology".
Mentored a second-year student to gain clinical and research experience in ophthalmology

5/20 Faculty organizer, Johns Hopkins medical students, "Global Blindness Symposium," Johns Hopkins University School of Medicine. Worked with 4 students to organize lecture for 120 first-year medical students at Johns Hopkins University School of Medicine.

8/20-12/20 Project Advisor, Independent Study in Biomedical Engineering, undergraduate students in Biomedical Engineering department at Johns Hopkins University.

5/21 Faculty organizer, Johns Hopkins medical students, "Global Blindness Symposium," Johns Hopkins University School of Medicine. Worked with 4 students to organize lecture for 120 first-year medical students at Johns Hopkins University School of Medicine.

6/21-8/21 Course Director, Johns Hopkins Medical Student Elective, "Scholarly Concentration: Ebola-associated eye disease". Mentored one second-year student to gain clinical and research experience in ophthalmology.

8/14/21 Teaching Faculty, Ophthalmology Residents, Johns Hopkins and Howard University Advanced Cataract Course. Baltimore, MD, USA.

1/22 -5/22 Research Mentor/Course lead for 5 undergraduate students. EN.580.510. Biomedical Engineering Undergraduate Research.

1/23 -5/23 Research Mentor/Course lead for one undergraduate student. EN.580.510. Biomedical Engineering Undergraduate Research.

12/7/23 Lecturer, Ophthalmology Residents, "Corneal Dystrophies." Wilmer Eye Institute at Johns Hopkins

2/2024 Course Director, "Clinical Elective in Global Ophthalmology." Two third year medical students enrolled in month-long elective. Johns Hopkins University School of Medicine.

National

4/4/16 Lecturer, graduate students in Fogarty NIH Course on Global Health, "Sustainability in the setting of Ebola Eye Disease." National Institutes of Health, Bethesda, Maryland, United States.

International

9/9/19 Lecturer, ophthalmology residents, "Cornea Transplantation," Udayana University in Bali, Indonesia.

2/20/24 Lecturer, ophthalmology residents, "Corneal Crosslinking," Udayana University in Bali, Indonesia.

Clinical instruction

JHMI/Regional

7/14-pres. Supervising Attending Surgeon, Ophthalmology Residents, Wilmer Eye Institute at Johns Hopkins; staff resident cataract surgeries

7/22/14 Wet Lab Course faculty, Cornea Fellows, Wilmer Eye Institute at Johns Hopkins; Hands-on training of cornea fellows in cornea transplantation techniques in cadaver eyes.

8/2/14 Wet Lab Course faculty, Ophthalmology Residents, "Nuclear Disassembly," Wilmer Eye Institute at Johns Hopkins.

11/16/14 Wet lab Course faculty, practicing Ophthalmologists, Johns Hopkins Cornea and Cataract Practicum, Wilmer Eye Institute at Johns Hopkins. Practical training of local ophthalmologists in cornea transplantation techniques in cadaver eyes.

7/16-present Core Cornea Fellowship Faculty, Ophthalmologists in Fellowship, Wilmer Eye Institute at Johns Hopkins.
To date, I have trained 25 cornea fellows in cataract, cornea and external diseases, both in the clinic and the operating room; five of these fellows have joined the Johns Hopkins faculty as Assistant Professor.

3/13/18 Wet lab course faculty, practicing Ophthalmologists, "Introduction to DMEK inserters," Current Concepts Conference, Vail, Colorado, USA. Presented and performed live demonstration of surgical instruments.

3/13/19 Wet lab course faculty, practicing Ophthalmologists, "DMEK Inserter Workshop," Current Concepts Conference, Vail, Colorado, USA. Presented and performed live demonstration of surgical instruments.

10/5/19	Wet Lab Course Co-organizer and Faculty, veterinary ophthalmologists, Endothelial Keratoplasty wet lab course, held at Johns Hopkins Ophthalmology Center for Surgical Education and Training; drew participants from United States and London.
National 10/15/16	Wet Lab Course Faculty, Learner Level: Ophthalmologists, “Descemet Membrane Endothelial Keratoplasty (DMEK).” American Academy of Ophthalmology Annual Meeting, Tissue Banks International Booth #2102, Chicago, Illinois. DMEK training course, real-time surgery on cadaver eyes.
5/6/17	Wet Lab Course Faculty, Learner Level: Ophthalmologists, “Descemet Membrane Endothelial Keratoplasty,” Keralink booth at American Society of Cataract and Refractive Surgeons Annual Meeting in Los Angeles, California. DMEK training course, real-time surgery on cadaver eyes.
11/11/17	Wet Lab Course Faculty, Learner Level: Ophthalmologists, “Descemet Membrane Endothelial Keratoplasty (DMEK),” Keralink booth at American Academy of Ophthalmology Annual Meeting, New Orleans, Louisiana. DMEK training course, real-time surgery on cadaver eyes.
11/12/17	Wet Lab Course Faculty, learner level: Ophthalmologists. “Learning the DMEK Procedure: An Introductory Course,” American Academy of Ophthalmology Annual Meeting, New Orleans, Louisiana. DMEK training course, real-time surgery on cadaver eyes.
10/27/18	Wet Lab Course Faculty, learner level: Ophthalmologists. “Learning the DMEK Procedure: An Introductory Course,” American Academy of Ophthalmology Annual Meeting, Chicago, Illinois; DMEK training course, real-time surgery on cadaver eyes.
10/13/19	Wet Lab Course Faculty, learner level: Ophthalmologists. “Learning the DMEK Procedure: An Introductory Course,” American Academy of Ophthalmology Annual Meeting, San Francisco, California; DMEK training course, real-time surgery on cadaver eyes.
2/8/20	Co-organizer, Learner Level: Veterinary Ophthalmologists, Veterinary Cornea Transplant Symposium, held at University of California at Davis, California.
11/14/20	Wet Lab Course Faculty, learner level: Ophthalmologists. “Learning the DMEK Procedure: An Introductory Course,” American Academy of Ophthalmology Annual Meeting; held online with video recording of surgery made in advance.
11/15/21	Wet Lab Course Faculty, learner level: Ophthalmologists. “Learning the DMEK Procedure: An Introductory Course,” American Academy of Ophthalmology Annual Meeting, New Orleans, Louisiana; DMEK training course, real-time surgery on cadaver eyes.
11/16/21	Wet Lab Course Faculty, learner level: Ophthalmologists. “Anterior Vitrectomy for the Cataract Surgeon,” American Academy of Ophthalmology Annual Meeting, New Orleans, Louisiana; surgical training course, real-time surgery on cadaver eyes.
International 9/18	Live surgical instructor, Learner Level: Ophthalmologist. Cataract Surgery. Addis Ababa, Ethiopia
10/18	Live surgical instructor, Learner Level: Ophthalmologists. “Descemet stripping endothelial keratoplasty, Khmer Soviet Friendship Hospital; Phnom Penh, Cambodia. <i>See Invited Lectures for separate invited lectures at this institution.</i>
9/2/19	Live surgical instructor, Learner Level: Ophthalmologists. Descemet stripping endothelial keratoplasty, Yangon Eye Hospital; Yangon, Myanmar. <i>See Invited Lectures for separate invited lectures at this institution.</i>
9/9/19	Live surgical instructor, Learner Level: Ophthalmologists. Descemet stripping endothelial keratoplasty, Udayana University; Denpasar, Indonesia. <i>See Invited Lectures for separate invited lectures at this institution.</i>
2/2023	Live clinical instruction, Vanuatu National Eye Centre. Learner Level: Ophthalmology attending and resident. Port Vila, Vanuatu
2/2024	Live surgical instruction, Vanuatu National Eye Centre. Learner Level: Ophthalmology attending and resident. Port Vila, Vanuatu

CME instruction

JHMI/Regional

- 6/3/11 Speaker, learner level: ophthalmologists. "Prevalence, Severity, and Genetics of Fuchs Corneal Dystrophy in Tangier Island." Wilmer Residents Association Annual Clinical Meeting, Baltimore, Maryland.
- 6/8/12 Speaker, learner level: ophthalmologists. "Application of Next Generation Sequencing to Unravel the Genetic Basis of Fuchs Corneal Dystrophy on Tangier Island." Wilmer Residents Association Annual Clinical Meeting, Baltimore, Maryland, June 2012.
- 6/14/13 Speaker, learner level: ophthalmologists. "New anatomic phenotypes in Fuchs Corneal Dystrophy." Wilmer Residents Association Annual Clinical Meeting, June 2013.
- 6/13/14 Speaker, learner level: ophthalmologists. "Refractive Changes in Fuchs Corneal Dystrophy." Wilmer Residents Association Annual Clinical Meeting, Baltimore, Maryland, USA.
- 10/23/14 Speaker, learner level: optometrists/ophthalmologists. "Implantable Collamer Lens: Indications and Outcomes." Wilmer Eye Institute at Bel Air Community Education Series.
- 10/14/15 Speaker, learner level: optometrists/ophthalmologists. "Smartphone imaging in ophthalmology." Wilmer Eye Institute at Bel Air Community Education Series.
- 12/15/16 Speaker, learner level: optometrists/ophthalmologists. "Ebola and the Eye." Wilmer Eye Institute Friday Afternoon Research Meeting.
- 1/24/17 Speaker, learner level: optometrists/ophthalmologists. "DMEK/DSEK: advances in partial-thickness corneal transplantation." Wilmer Eye Institute at Bel Air Community Education Series.
- 6/5/18 Speaker, learner level: optometrists/ophthalmologists. "Refractive goals in eyes with Fuchs dystrophy." Wilmer Eye Institute at Bel Air Community Education Series.

National

- 5/6/17 Speaker, learner level: ophthalmologists. Anterior Segment Laser Surgery in Ebola-Associated Eye Disease. ASCRS Annual Meeting, Los Angeles, California.
- 11/6/17 Speaker, learner level: tropical health specialists. Viral persistence and long-term ophthalmology outcomes in Ebola Virus Disease. ASTMH Annual Meeting. Baltimore, MD, USA.
- 11/12/17 Speaker, collaborative organizer of course with 5 academic ophthalmologists, learner level: ophthalmologists. Learning the DMEK Procedure: An Introductory Course. AAO Annual Meeting, New Orleans, LA, USA; Lecture (preceding but separate audience from wet lab).
- 10/27/18 Speaker, collaborative organizer of course with 5 academic ophthalmologists, learner level: ophthalmologists. Learning the DMEK Procedure: An Introductory Course. AAO Annual Meeting, Chicago, IL, USA; Lecture (preceding but separate audience from wet lab).
- 10/13/19 Speaker, collaborative organizer of course with 5 academic ophthalmologists, learner level: ophthalmologists. Learning the DMEK Procedure: An Introductory Course. AAO Annual Meeting, San Francisco, CA, USA; Lecture (preceding but separate audience from wet lab).
- 11/14/20 Speaker, collaborative organizer of course with 5 academic ophthalmologists, learner level: ophthalmologists. Learning the DMEK Procedure: An Introductory Course. AAO Annual Meeting, held virtually.
- 11/15/21 Speaker, collaborative organizer of course with 5 academic ophthalmologists, learner level: ophthalmologists. Learning the DMEK Procedure: An Introductory Course. AAO Annual Meeting, New Orleans, LA, USA; Lecture (preceding but separate audience from wet lab).
- 11/5/23 Speaker, collaborative organizer of course with 5 academic ophthalmologists, learner level: ophthalmologists. Learning the DMEK Procedure: An Introductory Course. AAO Annual Meeting, New Orleans, LA, USA; Lecture (preceding but separate audience from wet lab).

Workshops /seminars

Local/JHMI

None

National

- 5/1/16 Organizer, Moderator. Learner level: vision science researchers, including scientists and ophthalmologists. Diagnostic, medical and surgical capacity building in the setting of Ebola-associated eye disease. ARVO Annual conference. Seattle.

International

- 1/14/16 Speaker, learner level: Researchers and Ministry of Health officials. Update on Ebola-associated eye disease. 12th and Russell offices, Monrovia, Liberia.
- 1/15/16 Speaker, learner level: Eye technicians of Liberia. Update on Ebola-associated eye disease. JFK Hospital, Monrovia, Liberia.
- 1/30/17 Speaker and Coach, learner level: physicians and nurses in Liberia. Technical Writing Workshop. Monrovia, Liberia
- 4/29/19 Organizer, Moderator. Learner level: vision science researchers, including scientists and ophthalmologists. Health disparities, social justice and vision research. Held within ARVO Annual Conference, Vancouver, Canada.

Mentoring

Pre-doctoral Advisees /Mentees

- 5/14-6/17 SV, ophthalmologist in California, was resident in ophthalmology at Eastern Virginia University; awarded Association for Research in Vision and Ophthalmology Travel Grant Award in 2017 for research on visual acuity screening in Liberia. [OR-21, OR-23, CR-2]
- 7/14-6/15 BG, Physician in British Columbia, Canada [OR-13, OR-18]
- 7/14-6/15 AM, resident in ophthalmology, University of Maryland [OR-13, OR-18]
- 7/14-1/15 MA, evaluation coordinator at Johns Hopkins Bloomberg School of Public Health [OR18]
- 7/14-8/20 AE, surgical resident, was medical student at UMKC School of Medicine [OR-13, MT-5]
- 8/14-1/15 MR, physician in Irvine, California; [MT-2, OR-18]
- 9/14-5/15 SG, Researcher at HIV Cure Center- UNC Chapel Hill
- 5/16-6/18 AA, ophthalmology resident at University of Michigan; received the best Student Platform Presentation award at NANOS in 2017 [OR-19]
- 5/16-5/20 FV, medical student at UCLA; recipient of Classy Fellowship Award for social design and innovation for our work developing ophthalmology apps (2016), and a Best Poster Award at the American Academy of Ophthalmology Annual Meeting for his poster, “Smartphone application for assessment of visual acuity with statistical confidence” (2016) [OR-17]
- 7/16-6/19 GV, medical student at St. George’s University [OR-23]
- 6/16-6/19 RM, medical student at Harvard Medical School. Matched into ophthalmology at Harvard [OR-20, OR-37]
- 6/16-present MF, Johns Hopkins University School of Medicine; awarded Association for Research in Vision and Ophthalmology Travel Grant Award in 2018 [OR-28, OR-36, OR-38, OR-39, OR-40, CR-8, BC-9]. Matched into ophthalmology at Yale.
- 6/16-6/20 AS, medical student at the Johns Hopkins University School of Medicine [BC-7]
- 3/17-present MI, undergraduate at University of Maryland College Park [OR-28, OR-29, OR-33, OR-36, OR-39, OR-42]
- 4/17-present EC, currently CEO of Treyetech; awarded Venturewell E-team Stage 1 grant (\$5000 and Stage 2 grant (\$20,000) for development of a novel device to facilitate cornea transplantation surgery, awarded Best Life Science Startup Prize (\$20,000) at Rice University Business Plan Competition [OR-24, OR-27, OR-29, OR-37, MT-6, CR-9]
- 4/17-present KB, VP of Scientific Affairs for Treyetech and Senior Analyst at ClearView Healthcare Partners; awarded the prestigious MIT-Lemelson Student Inventor Prize in 2018, placing 1st out of 190 submissions, and the Courageous Women Entrepreneur Prize (\$10,000) at the Rice Business Plan Competition in 2019. [OR-24, OR-27, OR-29, OR-37, MT-6, CR-9]
- 4/17-present CYC, graduate student at University of Colorado School of Medicine and Treyetech co-founder; awarded \$10,000 from O’Connor Fund for development of novel cornea transplant device [OR-24, OR-27, OR-29, OR-37, MT-6, CR-9]
- 4/17-present AS, graduate student in Computational Finance at Carnegie Mellon University and Treyetech co-founder; awarded 3rd place from 41 entries, NIH National Institute of Biomedical Imaging and Bioengineering DEBUT competition. [OR-24, OR-27, MT-6]
- 4/17-present SC, analyst at Blackrock and Treyetech co-founder; awarded 2nd place of 51 international submissions (\$15,000 award), Values and Ventures Business Plan Competition [OR-24, OR-27, MT-6]
- I worked closely with the five students directly listed above as a team, and while each made a pivotal effort in applying for the awards associated with their names, it is a collective effort and all deserve recognition for all their awards noted.*

- 6/17-5/19 XH, completed PhD in Health Policy and Management at Johns Hopkins Bloomberg School of Public Health. Served as an advisor for his PhD program.
- 6/18-present MS, assistant at Center for Health and Human Rights [OR-37]
- 7/18-present SD, undergraduate at UMBC; awarded Phi Kappa Phi honors, AFSAA Scholarship recipient [OR-36, OR-37]
- 7/18-6/19 PN, undergraduate at University of Maryland College Park [OR-29]
- 8/18-present C, undergraduate at Johns Hopkins University and Treyetech team member; awarded 2nd place out of 70 submissions at Carnegie Mellon University Venture Challenge for development of novel cornea transplantation device [OR-24, OR-27, OR-37, MT-6]
- 8/18-present AR– undergraduate at Johns Hopkins University and Treyetech team member; awarded Queen’s Entrepreneurship Competition Innovation Award in 2019 [OR-24, OR-27, OR-37, MT-6]
- 8/18-present SJS, undergraduate at Johns Hopkins University; [OR-37, OR-44, MT-6, OR-53, CR-9, OR-53]. Became NIH predoctoral research fellow after graduation.
- 8/18-present BJW, undergraduate at Johns Hopkins University; awarded third place in Queen’s Entrepreneurship Competition, Toronto, Canada [OR-37, MT-6, CR-9]
- 1/19-6/20 TP, MD, matched into ophthalmology at University of Pennsylvania [OR-39, OR-40]
- 1/19-8/19 S, MD, resident in internal medicine, Loma Linda University
- 1/19-6/20 RB, MD, medical student at Johns Hopkins. Matched into residency in ophthalmology at Harvard [OR-40]
- 6/19-9/19 RA, undergraduate at University of Maryland College Park
- 10/19-present BG, undergraduate at Loyola University in Maryland; research on specular microscopy
- 3/19-present RK, PhD candidate in computer science at Michigan Technical University; received MTEC SmartZone Breakout Innovation Award (\$1000) for his development of automated analysis of corneal endothelium, and first place (\$7500) at the New Venture Competition in 2020 (1st place out of 17 teams), First Prize for Business Model in Bob Mark Pitch Competition (2021, \$2000, 1st place out of 9 teams), Social Impact Award (\$1000, Bob Mark Pitch Competition 2021), David and Janice Underwood Best Overall Venture (\$25,000) at New Venture Online Competition (1st out of 8 teams), First Prize at TCNewTech Pitch Competition (\$500) (1st out of 3 finalists). Received National Science Foundation I-CORPS grant. Became postdoctoral fellow at Harvard Medical School. [OR-47, OR-51, OR-52, OR-55]
- 8/20 – present KB, undergraduate student at Morgan State University. Accepted for oral presentation at AAO in 2023 for research on ChatGPT; out of 2131 submissions for paper or poster to AAO meeting in 2023, less than 7% of submissions (149/2131) were accepted for oral presentation of either paper or poster. [OR-57]
- 2/21 – present MA, medical student at Johns Hopkins University School of Medicine. Awarded Dean’s Year Predoctoral Research Fellowship. [CR-7, CR-8, MT-5]. Matched at Bascom Palmer Eye Institute for ophthalmology residency.
- 3/21 – present SM, medical student at Johns Hopkins University School of Medicine. [OR-49]
- 8/21 – present ER, undergraduate at Johns Hopkins. Awarded national recognition for work through Goldwater Scholarship and Astronaut Scholarship. Performed research into temperature control of intraocular fluids and submitted patent for innovations in viscoelastic. [OR-54]
- 5/23 – present RP, medical student at Howard University. Conducted research into corneal endothelium and specular microscopy at eye banks. [OR-55]

Post-doctoral Advisees /Mentees

- 7/15-6/18 AW, MD, PhD, cornea specialist in Pennsylvania; won Mitchell Prize (2015) for best resident research project at the Wilmer Eye Institute for a mobile imaging device, the Heed Fellowship (2015) as one of the top ophthalmology fellows in the United States (2015), and the ASCRS Foundation Research Grant Award (2017) for a device to facilitate Descemet Membrane Endothelial Keratoplasty. [MT-2, MT-5, OR-57]
- 7/15-6/16 MV, MD, ophthalmologist in Michigan [MT-3]
- 7/15-9/16 CXC, MD, Assistant Professor of Ophthalmology, Johns Hopkins
- 7/16-6/20 JZ, MD; fellowship in oculoplastics [OR-19, OR-28, OR-31, OR-32, OR-39]
- 7/16-6/18 SK, MD, Assistant Professor at Johns Hopkins Univ. School of Medicine; awarded a young ophthalmologist best paper award at ASCRS 2018. [OR-29, OR-33, CR-3]
- 7/17-6/18 TL, MD; Assistant Professor at Johns Hopkins Univ. School of Medicine [OR-33]
- 7/17-6/18 SK, MD; cornea specialist in Ohio [CR-8]

7/17-6/18 JY, MD; cornea specialist at Harvard [OR-57]
 6/18-present MA, VMD, veterinary ophthalmologist in Washington, DC [CR-4]
 7/18-6/19 JD, cornea specialist in Florida [OR-41, OR-57]
 7/18-6/19 PM, cornea specialist in Florida [OR-57]
 7/19-6/20 DD, MD; cornea fellow at the Bascom Palmer Eye Institute at the University of Miami [OR-36, OR-37, OR-41, OR-46, CR-8]
 7/19-6/20 NS, MD, MPH; Assistant Professor at JHUSOM [MT-5, MT-6]
 7/20-6/21 KB, MD; private practice [CR-7]

Thesis Committees

3/19 XH, PhD, Thesis Title: AIMING TO SCALE: THE VALIDITY, USABILITY, AND BUSINESS MODEL OF A NOVEL TELEOPHTHALMIC DEEP LEARNING SCREENING TECHNOLOGY.
 Role: Clinical advisor. Momo He developed and studied a method of screening for cataract in remote areas of China using a deep learning, smartphone-based approach. It has the potential to empower traditional village healers to diagnose cataract and arrange for patients who require surgery to receive it. His committee included advisors from business and public health. My input provided a clinical perspective for technology development and guidance for research.

4/22 RK, PhD
 Role: Clinical advisor. Ranit developed methods of analyzing corneal endothelium and eye banking data using artificial intelligence.

Educational Program Building / Leadership

2016-2022 Director/Advisor, First-year medical student Global Health Ophthalmology Symposium. Each year, I worked with first year medical students to present global health topics in ophthalmology to their peers. For two students, their initial forays into ophthalmology have developed into research projects which we have published in *Cornea* and *Neuro-ophthalmology*. [OR-19, OR-38]

2019-2022 Co-coordinator, Medical Student Elective Skills Lab (with Dr. Meraf Wolle)
 Every month, we teach students on the general ophthalmology elective about how to use diagnostic tools and to interpret their findings, through hands-on use of these devices in clinic.

2019-present Together with Micki Armour, a veterinary ophthalmologist in Washington, DC, we have organized a series of courses to train veterinary ophthalmologists how to perform endothelial keratoplasty, a procedure which we have gained experience performing to restore sight to dogs. Our courses have included an international audience of veterinary ophthalmologists from 6 countries, and have been held in California, Chicago, and Baltimore.

2019-present Mock Interview Faculty, Johns Hopkins University School of Medicine
 Each year, we work with medical students at JHUSOM applying into ophthalmology to become comfortable explaining their story, their work, and their plans as part of the interview process. This is part of an effort organized by the School of Medicine to prepare students for applying to residency.

Educational Demonstration Activities to external audiences, on or off campus

None

RESEARCH ACTIVITIES

Research Focus

My research focus covers two main areas: Ebola eye disease and corneal endothelial dystrophies.

Ebola survivors frequently experience eye complications. As co-lead of the eye section of the five-year, longitudinal cohort study NIH PREVAIL III (Partnership for Research on Ebola Virus in Liberia), our research seeks to characterize Ebola-associated eye disease through a combination of clinical examination and imaging. As Adjunct Principal Investigator of

NIH PREVAIL 7, we studied risk of viral persistence and characterized surgical outcomes in people who survived Ebola virus disease. We continue to investigate long-term effects and underlying disease mechanisms.

Fuchs dystrophy is a leading indication for corneal transplantation in the United States. My research focuses on precision medicine and seeks to better understand disease genetics, to better define disease severity, and to develop technologies to better treat the disease.

Research Program Building/Leadership

2014-present

Characterization of Ebola Eye Disease

Eye complications are highly prevalent among survivors of Ebola virus disease, but little was known prior to the 2014 epidemic in West Africa. We investigated these features as part of PREVAIL 3, a five-year longitudinal cohort study that enrolled 3928 EVD survivors and close contacts, for which I served as co-lead investigator for the eye study. We received the ASCRS Foundation Research Grant Award to study viral persistence, an initiative that evolved into PREVAIL 7, a study of intraocular viral persistence and surgical outcomes. Our research identified a spectrum of ocular pathology affecting the visual pathway in survivors of Ebola virus disease, which we shared in the *New England Journal of Medicine* [OR-29] and *JAMA Network Open* [OR-40]. The data in PREVAIL 7 demonstrated resolution of intraocular viral persistence by two years following symptom onset [OR-42], but continued effects on intraocular pressure even after five years [OR-49]. To carry this out, we worked through a partnership between the Liberia Ministry of Health and the United States National Institutes of Health. We collaborated with local staff and colleagues, and supported clinicians in academic efforts to present and/or publish their work. We developed national meetings that brought together collaborators in ophthalmology across the country as a step toward building local academic ophthalmology.

2014-present

Genotype/Phenotype correlations in Fuchs Dystrophy

Historically, for patients receiving a diagnosis of Fuchs dystrophy for the first time, clinicians have been unable to offer specific individual guidance for their prognosis beyond the fact that there is a chance they will need a corneal transplant. However, identifying genotype-phenotype correlations allows for a precision-based approach to understanding disease progression and outcomes. As a trainee, we identified specific patterns of development of guttae related to the *FCD1* [OR-4] locus and the Tangier population [OR-10]. Upon joining the faculty, our collaborative team identified patterns of edema related to mutations in *COL8A2* [OR-14] and increases in severity in patients with CTG18.1 trinucleotide repeat expansion in *TCF4* [OR-12, OR-17]. As part of my K12 research, we built a new team with collaborators from the National Institutes of Health and together identified thinner corneal thickness and cornea guttata associated with mutations in *TGFB2* [OR-38]. Together, these data allows for a future of patient care in which we can more accurately predict one's clinical outcome based on genetic variants present in each individual.

2014-2019

Development of Retroillumination Photography Analysis

Fuchs Dystrophy affects millions of Americans and is the leading indication for endothelial keratoplasty in the US, yet methods to describe its severity and progression are limited by poor inter-rater reliability, or different baseline measurements across populations. As a predoctoral fellow, we developed a technique, retroillumination photography analysis, to increase the resolution with which we define severity by summing and plotting the number of opacities affecting the cornea (up to approximately 10,000 guttae). Using this technique, we have demonstrated disease progression [OR-4], identified genotype-phenotype correlations across families [OR-7] and an island population [OR-10]. After joining the faculty, we assembled a team to advance this work, demonstrating a strong correlation with subjective clinical grading scores [OR-13] and automating the process to reduce analysis time for a high-severity image from multiple days down to approximately one minute per image [OR-18].

2017-present

Endothelial Keratoplasty for Treatment of Canine Corneal Endothelial Dystrophy

Several breeds of dogs experience an increased prevalence of corneal dystrophy which leads to corneal swelling, painful corneal blisters and ulcers, opacification, and blindness. Until five years

ago, the only treatment was palliative and involved either covering the cornea with a layer of conjunctiva or using cautery to create scar tissue and prevent formation of blisters. Collaborating with a veterinary ophthalmologist, we conducted the first cases of endothelial keratoplasty (partial thickness cornea transplant) to reverse corneal blindness in dogs [CR-6]. Given the larger size of their eyes, we developed dedicated canine tissue insertion devices and demonstrated that corneas can continue to stay clear for at least four years after surgery [CR-9]. We created an organization that developed educational sessions and trained approximately one in six veterinary ophthalmologists in the United States how to perform this surgery. In addition to the beneficial effect of this new therapy for pets, overcoming the unique challenges of this animal model of corneal dystrophy has helped to strengthen our surgical approaches in humans, and we recently described a suturing technique that was developed for canine transplants but is now integrated into human care [CR-6]. This experience has provided insights into the strengths and pitfalls of developing a new technique.

2017-present

Pre-loaded, tri-folded Descemet Membrane Endothelial Keratoplasty (DMEK)

DMEK is the most recent major evolution of partial-thickness corneal transplants that directly delivers a layer of corneal endothelial cells to the posterior cornea to heal swelling. However, its adoption has been limited by the fact that it is technically challenging to perform and the tissue has a tendency to scroll up once positioned in the eye. We assembled a team that studied and disseminated findings regarding the safety, feasibility, biomechanics and outcomes of an approach that involves both loading and folding a corneal graft while at the eye bank into a device prior to surgery to assist with its delivery into the eye. I served as research advisor and faculty sponsor for an undergraduate design team that won first place out of 190 submissions for the Lemelson-MIT Student Inventor Prize, in creating a device designed for this technique [MT-4]. Our team demonstrated that grafts can be successfully folded in the eye bank by trained technicians [OR-25], that they can be preloaded and folded into a device and stored for 48 hours with graft viability comparable to the standard of care [OR-28], that such folded grafts could be safely loaded or injected into the eye using a no-touch technique [OR-30], that good and comparable outcomes could be achieved by using a device assembled with parts available in most operating rooms [OR-32] or by using a commercially available device [OR-41], that keeping grafts folded for 48 hours can beneficially affect the biomechanics of the tissue to facilitate surgery [OR-37], and that grafts can be safely loaded and shipped in advance of surgery for 96 hours [OR-44].

Research Demonstration Activities

2/2/16 Lecture on manuscript writing to 50 nurses and physicians at Liberia Scientific Writing Workshop, Monrovia, Liberia.

Inventions, Patents, Copyrights

11/15/18 Co-inventor
 Device for facilitating Descemet Membrane Endothelial Keratoplasty (WO2018208729A1)
<https://patentimages.storage.googleapis.com/5f/c1/00/8c49524cefbb19/WO2018208729A1.pdf>

9/2/22 Co-inventor
 “Corneal endothelial cells derived from pluripotent stem cells corrected with Crispr/cas9”

11/17/23 Co-inventor
 Provisional Application No. 63/564,602 – ROCHER et al.
 SYSTEMS AND METHODS FOR VISUALIZING OPHTHALMIC VISCOSURGICAL DEVICE DURING AND FOLLOWING OCULAR SURGERY AND VISCOSURGERY

Technology Transfer Activities

2016-present Co-Founder

Treyetech

The mission of Treyetech is to help make corneal transplantation more available to patients and surgeons by simplifying surgery. This group has made inserters for Descemet Membrane Endothelial Keratoplasty in humans and for Descemet Stripping Endothelial Keratoplasty in dogs.

SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES

System Innovation Focus

Our work to date in system innovation focuses on facilitating access to care in resource-limited settings, both in the United States and abroad.

System Innovation and Quality Improvement efforts within JHMI:

None

System Innovation and Quality Improvement efforts outside of JHMI:

- 2013-2015 Co-founder, BMore Visible. Co-developed system together with neighbors in East Baltimore in which neighbors visit one another, assess needs, facilitate transportation and personally deliver glasses directly to a neighbor's house. Facilitated delivery of over 100 pairs of glasses and built an increasing vision of how neighbors can support one another in care.
- 2015-2016 Co-developer, smartphone visual acuity screening initiative in Liberia. Visual acuity screening is an important aspect of any eye examination; however, periodic blackouts made consistent lighting of any eye chart a challenge. Together with nurses, deployed a smartphone vision screening tool across multiple sites in which we trained staff on its use, established protocols, and collected data across over 1000 patients to analyze its successful ability to identify vision loss. The data was presented at the Association for Research in Vision and Ophthalmology Annual Meeting.

System Innovation and Quality Improvement Program Building/Leadership:

None

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

- 2003-2004 Member by appointment, McKinley Health Center Student Advisory Board, Urbana, Illinois
- 2009-2010 Member by election, Transitional Year Medical Education Committee, St. Francis Hospital
- 2009-2010 Member by election, Graduate Medical Education Committee, St. Francis Hospital
- 2015-2018 Member by election, Faculty Senate, Johns Hopkins University School of Medicine
- 2016 Co-organizer, Cornea Faculty Retreat (appointed by Division Chief)
- 2016-present Wilmer Cornea Fellowship Application Selection Committee
- 2018-present CME Advisory Board, Johns Hopkins University School of Medicine
- 2021-present Wilmer Associate Professor Promotions Committee
- 2023-present Wilmer Residency Application Screening Committee

Editorial Activities

Editorial Board appointments

None

Journal peer review activities

- 2013-present Reviewer, *Ophthalmology*
- 2013-present Reviewer, *Clinical Ophthalmology*
- 2013-present Reviewer, *Eye*
- 2014-present Reviewer, *BMC Ophthalmology*
- 2014-present Reviewer, *Ocular Immunology and Infection*
- 2014-present Reviewer, *Infection and Immunity*
- 2015-present Reviewer, *JAMA Ophthalmology*
- 2015-present Reviewer, *Metabolic Brain Disease*

2016-present	Reviewer, <i>Journal of Cataract and Refractive Surgery</i>
2017-present	Reviewer, <i>Cornea</i>
2017-present	Reviewer, <i>British Journal of Ophthalmology</i>
2017-present	Reviewer, <i>IOVS</i>
2018-present	Reviewer, <i>Journal of Cataract and Refractive Surgery</i>
2020-present	Reviewer, <i>PLoS One</i>
2020-present	Reviewer, <i>Eye and Vision</i>
2020-present	Reviewer, <i>BMJ Open Ophthalmology</i>
2020-present	Reviewer, <i>Acta Ophthalmologica</i>
2020-present	Reviewer, <i>American Journal of Ophthalmology</i>
2020-present	Reviewer, <i>Asia-Pacific Journal of Ophthalmology</i>
2020-present	Reviewer, <i>Graefe's Archive for Clinical and Experimental Ophthalmology</i>
2021-present	Reviewer, <i>International Journal of Molecular Sciences</i>
2021-present	Reviewer, <i>Scientific Reports</i>
2022-present	Reviewer, <i>American Journal of Ophthalmology Case Reports</i>
2022-present	Reviewer, <i>Medical Mycology</i>
2022-present	Reviewer, <i>Ophthalmology and Therapy</i>
2023-present	Reviewer, <i>Survey of Ophthalmology</i>
2023-present	Reviewer, <i>Ophthalmology Science</i>
2023-present	Reviewer, <i>Canadian Journal of Ophthalmology</i>
2023-present	Reviewer, <i>Heliyon</i>
2023-present	Reviewer, <i>Mayo Clinic Proceedings: Digital Health</i>
2023-present	Reviewer, <i>Ophthalmology Retina</i>
2023-present	Reviewer, <i>BMJ Case Reports</i>

Other peer review activities

None

Advisory Committees, Review Groups/Study Sections

2014	Ad Hoc Reviewer, King Khaled Eye Specialist Hospital/Wilmer Eye Institute Grants
2015-2018	Advisory Board Member, Johns Hopkins Social Innovation Lab
2017	Ad Hoc Reviewer (USAID), PEER Liberia Grants
2022	Ad Hoc Grant Reviewer (NIH), National Eye Institute (NEI) Special Emphasis Panel 2022/10 ZEY1 VSN (09) 1
3/10/23	Ad Hoc Grant Reviewer, Research to Prevent Blindness, New York City
3/28/23	Ad Hoc Grant Reviewer (NIH), National Eye Institute (NEI) Special Emphasis Panel 2023/10 ZEY1 VSN (09) 2
10/23	Ad Hoc Grant Reviewer, Wilmer Pooled Professor Fund Luty Grant
3/24	Ad Hoc Grant Reviewer (NIH), National Eye Institute (NEI) Special Emphasis Panel/Scientific Review Group 2024/10 ZEY1 VSN (09) 1
3/24	Ad Hoc Grant Reviewer, Johns Hopkins Undergraduate Research, Summer PURA fellowships

Professional Societies

2007-present	Member, Association for Research in Vision and Ophthalmology
2010-present	Member, American Academy of Ophthalmology
2013-present	Member, American Society of Cataract and Refractive Surgery
2019-present	Cornea Society Member with Thesis <i>Membership with Thesis is by election for advancing knowledge in the field through research.</i>

Conference Organizer

JHMI/Regional

National

- 3/30/19 Endothelial Keratoplasty Symposium
Organized single day conference with cornea transplant surgeons presenting experiences from the Netherlands, Florida, Georgia, Massachusetts, Washington DC, and Maryland.
- 2/8/2020 Veterinary Cornea Transplant Symposium
Organized single day conference held at University of California Davis, with training on how to perform endothelial keratoplasty in dogs.

International

- 6/14/15 1st biannual Liberia Eye Care Meeting
Sponsors: US Embassy and National Institutes of Health
Co-organized and co-convened single-day meeting of eye care stakeholders in Liberia: Ophthalmologists, optometrists, NGOs, Ministry of Health, Cataract nurses, Ebola survivor group representatives.
Discussions were held regarding current state of eye care and future initiatives in country.
- 1/9/16 2nd biannual Liberia Eye Care Meeting
Sponsors: Liberia Ministry of Health and Social Welfare, National Institutes of Health
Co-organized and co-convened single-day meeting of major eye care stakeholders in Liberia: ophthalmologists, optometrists, ophthalmic nurses, Ministry of Health, Ebola survivors, NGOs (e.g., Sight Savers, Medecins Sans Frontieres), CDC, WHO to discuss current and future eye care in Liberia.

Session Chair

JHMI/Regional

- 12/3/15 Chair, Cornea Case Section, Current Concepts in Ophthalmology, Baltimore, MD

National

- 5/1/16 Organizer/moderator/session chair. Diagnostic, medical and surgical capacity building in the setting of Ebola-associated eye disease. ARVO Annual Meeting. Seattle, USA.

International

- 1/30/17 – 2/4/17 Session Chair. Scientific Technical Writing Workshop, Monrovia, Liberia.
- 10/1/18 Cornea Chief/Session Chair, talks and instructional course on cornea transplantation, National Eye Meeting, Khmer Soviet Friendship Hospital, Phnom Penh, Cambodia
- 5/2/19 Moderator, Cornea Poster Session, ARVO Annual Meeting, Vancouver, Canada
- 4/29/19 Organizer/moderator/session chair. Health disparities, social justice and vision research. ARVO Annual Meeting, Vancouver, Canada
- 9/11/19 Cornea Session Chair, Indonesia Eye Meeting, Denpasar, Indonesia

Consultantships

None

RECOGNITION

Awards, Honors

- 2001 Chancellor's Scholar (Top 1% of class for academic performance), Univ. of Illinois
- 2002 Howard Hughes Medical Institute Undergraduate Research Fellowship (mentor Neal Cohen)
- 2003 Howard Hughes International Scholar Undergraduate Research Fellowship (mentor Louis Schofield)
- 2003 Chancellor's Award for Excellence in Public Engagement, Univ. of Illinois
- 2004 Joseph H. Smith Award for contributions to interracial and cultural understanding, Univ. of Illinois
- 2009 Dean's Predoctoral Research Fellowship, Johns Hopkins University School of Medicine
- 2011 Wilmer Eye Institute Mitchell Resident Research Prize, 3rd place
- 2012 Wilmer Eye Institute Mitchell Resident Research Prize, 1st place
- 2013 Johns Hopkins Social Innovation Lab Awardee
- 2013 2nd place, Johns Hopkins University Global mHealth Initiative Concept Design Competition
- 2013 Claes Dohlman Society Fellowship Award, Claes Dohlman Society
Awarded to a single new Cornea specialist worldwide for academic and clinical excellence
- 2013 Aliko Perroti Scholar, Cornea Division, Wilmer Eye Institute at Johns Hopkins
- 2014 National Eye Institute Travel Grant, ARVO Annual Meeting

- 2014 National Institutes of Health Loan Repayment Award, National Institutes of Health
- 2015 Dean's Scholarship, Johns Hopkins Bloomberg School of Public Health
- 2016 Fellow (by election), American Academy of Ophthalmology
- 2016 ARVO/Alcon Early Career Clinician-Scientist Award
Awarded annually at ARVO meeting to five ophthalmologists globally in first five years of career for excellence in research
- 2018 Research to Prevent Blindness Special Scholar Award
- 2018 MIT-Lemelson Student Inventor Prize – Team Advisor (first out of 190 teams nationally)
- 2019 Delta Omega, Johns Hopkins Bloomberg School of Public Health
- 2019 40 Under 40 Award, Baltimore Business Journal
This award recognizes 40 business leaders in Maryland making an impact under 40 years of age. Three were selected from healthcare.
- 2019 Member *with Thesis* (by election), Cornea Society
- 2022 American Ophthalmological Society Annual Meeting Travel Grant

Invited Talks

JHMI/Regional

- 11/16/13 “Primum Non Nocere.” Presented by invitation to Wilmer Cornea Meeting at American Academy of Ophthalmology Annual Meeting. New Orleans, Louisiana, USA
- 12/6/13 “Keratoglobus.” Presented by invitation of Dr. Walter Stark to Current Concepts in Ophthalmology. Baltimore, Maryland, USA.
- 12/4/14 “Updates in Pentacam Scheimpflug imaging.” Presented by invitation of Dr. Walter Stark to Current Concepts in Ophthalmology. Baltimore, Maryland, USA.
- 10/27/15 “Ocular Manifestations of the Ebola Virus.” Presented by invitation to American Society of Ophthalmic Registered Nurses, Chesapeake Division. Baltimore, MD, USA.
- 10/5/16 “DMEK: State of the Art.” Talk on recent innovations in corneal transplantation. Learner level: Cornea specialists and tissue bank executives. Baltimore, Maryland, USA.
- 5/19/17 “Ebola and the Eye: Nurses at the Forefront.” Plenary talk presented by invitation to 34th Annual Wilmer Nurses Conference. Baltimore, MD, USA.
- 3/12/18-3/13/18 “Smartphones for the General Ophthalmologist.” “Refractive considerations in Fuchs Corneal Dystrophy.” “Update on Ebola and the Eye.” Talks presented by invitation at Current Concepts Conference, Vail, Colorado, USA.
- 5/1/18 “Automated vehicle user interfaces for drivers with mild visual impairment.” Presentation given by invitation to approximately 75 government and industry leaders in State of Maryland to the Maryland Department of Transportation's Connected and Automated Vehicles Working Group
- 3/11/19-3/12/19 “Smartphones for the General Ophthalmologist.” “Refractive considerations in Fuchs Corneal Dystrophy.” “Update on Ebola and the Eye.” Talks presented by invitation at Current Concepts Conference, Vail, Colorado, USA.
- 12/3/20 “Advances in Specular Microscopy.” Audience: 100 eye doctors, annual Current Concepts Conference, Baltimore, Maryland, USA.
- 6/3/22 “Cataract Surgery During the SARS-CoV-2 Pandemic.” Audience: 153 clinical staff from Johns Hopkins Wilmer Eye Institute at 37th Annual Wilmer Conference. Invited Virtual Talk.

National

- 12/8/14 “Quantitative measure of progression in Fuchs Corneal Dystrophy.” Presented by invitation of Dr. Kalliopi Stasi to Novartis, Boston, MA.
- 10/2/15 “Ebola and the Eye.” Presented by invitation, National Eye Institute Grand Rounds.
- 6/11/16 “Ebola and the Eye.” Delivered named lecture by invitation, Robert J. Netzel Lecture. 61st Annual Clinical Conference. Kresge Eye Institute, Detroit, Michigan, USA.
- 8/17/16 “Emerging Diseases in Ophthalmology: Ebola and Zika Viruses.” Presented by invitation to ophthalmologists nationally, American Academy of Ophthalmology Clinical Education Webinar.
- 10/14/16 “Ebola and the Eye.” Plenary talk presented by invitation, American Society of Ophthalmic Registered Nurses Annual Meeting, Chicago, Illinois.
- 10/15/16 “Descemet Membrane Endothelial Keratoplasty.” Talk and live surgical training session delivered by invitation of Tissue Banks International at American Academy of Ophthalmology Annual Meeting in Chicago, Illinois.

- 10/16/16 “Meet the Experts: Ebola and Zika viruses.” Invited by American Academy of Ophthalmology. American Academy of Ophthalmology Annual Meeting, Chicago, Illinois, USA.
- 4/30/17 “Corneal transplantation: techniques and approaches.” Plenary keynote address by invitation at Eye Care for Animals Annual Meeting to veterinary ophthalmologists. Phoenix, Arizona.
- 5/6/17 “Descemet Membrane Endothelial Keratoplasty.” Talk and live surgical training session delivered by invitation of Keralink at American Society of Cataract and Refractive Surgeons Annual Meeting in Los Angeles, California. Audience: Ophthalmologists nationally.
- 9/22/17 “Descemet Membrane Endothelial Keratoplasty.” Live webinar talk given to 20 eye bank representatives across country about surgeon transition to DMEK. Delivered by invitation by Keralink.
- 3/3/18 “Optimizing the DMEK scroll to facilitate insertion.” Presented by invitation, Fuchs Symposium VI, March 3, 2018. Audience: 100 cornea surgeons. Philadelphia, PA.
- 9/29/18 “Ebola and the Eye” Audience: Ophthalmic Anesthesia Society Annual meeting, Chicago, IL
- 5/3/19 “Irrigating forceps for DMEK graft manipulation in vitrectomized eyes.” Presented by invitation at the NIIOS Cornea Evening in San Diego, CA. Audience: Ophthalmologists.
- 7/30/19 “Revolutions and Evolutions: a Review of Advancements in Cornea Transplantation in Humans.” Delivered keynote address at Veterinary Ophthalmic Surgery annual meeting, Chicago, Illinois, USA.
- 1/11/20 “Tri-folded DMEK” Presented by invitation to Fuchs Symposium VII. Audience: 100 cornea surgeons. West Palm Beach, Florida, USA
- 6/19/21 “Uveitis in Survivors of Ebola Virus Disease.” Invited to speak at 35th Annual Barkan Research Symposium, California Pacific Medical Center, San Francisco, California, USA.
- 8/28/21 “Corneal Transplantation: History and Future Directions.” Keynote address given at Virginia Society of Eye Physicians and Surgeons Annual Meeting. Audience: 150 ophthalmologists from Virginia. Williamsburg, Virginia.
- 8/28/21 “Ebola Eye Disease and Lessons for COVID-19.” Keynote address given at Virginia Society of Eye Physicians and Surgeons Annual Meeting. Audience: 150 ophthalmologists from Virginia. Williamsburg, Virginia.

International

- 6/30/15 “Update in Cataract and Keratoplasty.” Presented by invitation of Ophthalmic Society of Nigeria, at McCure Eye Hospital, Lagos, Nigeria.
- 8/4/15 “Ebola-associated eye disease.” Presented by invitation by World Health Organization to WHO Meeting on Survivors of Ebola Virus Disease: Clinical Care, Research and Biobanking. Freetown, Sierra Leone.
- 9/18/15 “Ophthalmic Manifestations of Ebola Virus Disease.” Presented by invitation by United Nations Special Envoy on Ebola to the Meeting of the Global Ebola Response Coalition.
- 2/2/16 “Anatomy of a Paper.” Presented by invitation of Partnership on Research on Ebola Virus Disease in Liberia (PREVAIL) at Liberia Scientific Writing Workshop. Monrovia, Liberia.
- 10/1/18 “Cornea transplantation.” Phnom Penh, Cambodia National Eye Meeting. Audience: 100 residents and country’s cornea surgeons.
- 11/15/18 “Injected, tri-folded Descemet Membrane Endothelial Keratoplasty.” Presented by invitation at Turkish Ophthalmological Association Meeting, Antalya, Turkey.
- 5/28/19 “Descemet Membrane Endothelial Keratoplasty.” Presented by invitation at PAAO in Cancun, Mexico.
- 9/6/19 “Cornea Transplantation.” Presented by invitation at Myanmar Eye Meeting, Yangon, Myanmar.
- 9/10/19 “Descemet membrane endothelial keratoplasty.” Presented by invitation at Indonesia Eye Meeting, Denpasar, Indonesia
- 11/8/19 “Preloaded, tri-folded Descemet Membrane Endothelial Keratoplasty.” Presented by invitation at Turkish Ophthalmological Association Meeting, Antalya, Turkey.
- 10/29/20 “Management of Complications in Cataract Surgery and Keratoplasty.” Presented by invitation to 290 ophthalmologists, residents and medical students at 2nd annual Indonesia Eye Meeting, Denpasar, Indonesia.
- 11/15/21 “Corneal Infections During Travel” and “High Altitude and Corneal Disease.” Presented by invitation to 140 ophthalmologists, residents and medical students at 3rd annual Indonesia Eye Meeting hosted by Udayana University in Denpasar, Indonesia.

4/1/23

“The Pull-Through Technique– the Preferred “Entry-level” Technique for the Novice DMEK Surgeon: the Wilmer Experience” and “Artificial Intelligence in Specular Imaging and Eye Banking.” Fuchs Symposium VIII. Audience: 200 ophthalmologists across four continents.

2/19/24

“Persistent Corneal Edema after Phacoemulsification”, “Corneal Crosslinking for Keratoconus”, and “Treatment of Recurrent Corneal Erosions”. Audience: 70 ophthalmology faculty and residents at Udayana University, Denpasar, Indonesia.