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The faculty at the Shiley Eye Institute and Viterbi Family Department of Ophthalmology is fortunate to collaborate on research projects with many areas across the UC San Diego campus. These partnerships often open doors to funding and new relationships but more importantly are translating our research into real world discoveries and treatments for patients with eye diseases and vision disorders.

Natalie Afshari, MD, Professor and Vice Chair, is collaborating with **Gene Yeo, PhD** (Professor of Cellular and Molecular Medicine) and scientists at Case Western Reserve University to investigate the genetic basis of Fuchs Endothelial Dystrophy. They are searching for novel targets to develop gene therapies. R01EY029166 (Yeo and Afshari)

Radha Ayyagari, PhD, Professor of Ophthalmology and Pathology, is collaborating with **Bing Ren, PhD** (Professor of Cellular and Molecular Medicine, and Director, Center for Epigenomics) and **Kelly A. Frazier, PhD** (Professor of Pediatrics and Director of the Institute of Genomic Medicine) using genetics and epitranscriptomics to study the contribution of individual retinal cell type specific epigenomic changes on retinal aging, early and late-onset retinal/macular degeneration pathology. RO1EY031663 (Ayyagari, Frazer and Ren).

Sally Baxter, MD, MSc, Assistant Professor, is a member of a team of clinical informaticists led by **Lucila Ohno-Machado, MD, PhD**, (Professor of Medicine/Division of Biomedical Informatics) to develop and deploy queries related to COVID-19 across multiple electronic health record (EHR) systems. This is supported by the Gordon and Betty Moore Foundation.

Sally Baxter, MD, MSc is collaborating with **Ming Tai-Seale, PhD**, (Professor of Family Medicine) to analyze associations between EHR use and physician burnout with support from the American Medical Association (AMA) Practice Transformation Initiative.

Shyamanga Borooah MD, PhD, Assistant Professor, is collaborating with **Eric Adler MD**, (Professor of Medicine and Medical Director of the Heart Transplant Program at UCSD Health) to develop a gene therapy for children with a rare inherited sight threatening and heart disease. This work is supported by the Knights Templar Eye Foundation (PI: Borooah).

Andrew Camp, MD, Assistant Professor, and R**obert N. Weinreb, MD**, Distinguished Professor and Chair, are collaborating with **James Friend, PhD** (Professor of Mechanical and Aerospace Engineering and Director, Medically Advanced Devices Lab) to develop a novel eye pressure measurement device to provide a gold standard that can be used in any patient, including those with corneal disease or injury in whom current methods are inaccurate.

In collaboration with **Mark Tuszynski, MD, PhD**, (Distinguished Professor of Neurosciences and Director, UCSD Translational Neuroscience Institute), **Jiun Do, MD, PhD**, Assistant Professor, is focusing on regenerating the optic nerve by adapting stem cells strategies used in spinal cord injury research to regenerate the optic nerve and enable whole eye transplants. K08EY033032 (Do).

William Freeman, MD, Distinguished Professor and Vice Chair, is collaborating with Truong Q. Nguyen, PhD (Professor of

Electrical and Computer Engineering) to use Artificial Intelligence to enhance our analysis of retinal imaging scans to better understand retinal disease, treatments and help guide clinical trials. The work is funded by R01EY033847 (Nguyen, Freeman).

Catherine Liu, MD, PhD, Assistant Professor, is collaborating with **David Peterson, PhD** (UCSD Institute for Neural Computation and Salk Institute for Biological Studies) to study blepharospasm, a movement disorder involving the periocular region that can be functionally blinding. They are using computer vision and machine learning to model and understand the pathologic, dynamic features of blepharospasm and hemifacial spasm.

Sasan Moghimi, MD, Associate Professor, is collaborating with **Tara Javidi, PhD**, (Professor of Electrical and Computer Engineering and the Halicioglu Data Science Institute), to investigate the structure, function and microvasculature of the optic nerve and retina with artificial intelligence to improve monitoring of advanced glaucoma. The work is funded by R01EY029058 (Weinreb).

Eric Nudleman, MD, PhD, Associate Professor and **Napoleone Ferrara, MD**, Distinguished Professor of Pathology and Ophthalmology and Senior Deputy Director for Basic Sciences at the UCSD Moores Cancer Center, are collaborating on a novel long-acting VEGF inhibitor. The research is funded in part by R01 EY031345-01 (Ferrara).

Eric Nudleman, MD, PhD, Associate Professor is collaborating with **Richard Daneman, PhD** (Associate Professor of Pharmacology and Neurosciences) to study the mechanism of blood-retinal barrier dysfunction, including the development of scarring (fibrosis) in response to abnormal vascular function. Dr. Daneman recently received the prestigious Research to Prevent Blindness Stein Innovation Award.

Jolene Rudell MD, PhD, Assistant Professor, is collaborating with **Marianna Alperin, PhD** (Associate Professor of Obstetrics, Gynecology, and Reproductive Sciences) studying the biology of extraocular muscles in eye movement disorders such as strabismus and its effects on visual development. Her work was supported by K12EY024225 (Weinreb).

Using stem cell-based models of human retinal development and disease, **Karl Wahlin, PhD**, Assistant Professor, and **Stuart Lipton, MD, PhD** (Adjunct Professor of Neurosciences) are collaborating to investigate a link between microglia in human Alzheimer's disease and inherited retinal degenerations. It is hoped that these studies will uncover new therapeutic drug targets for treating retinal degenerations that might otherwise lead to vision loss.

In collaboration with **Todd Coleman, PhD** (Professor, Bioengineering UCSD and Stanford University) and **Camille Nebeker, PhD** (Associate Professor, Family Medicine and Wertheim School of Public Health), **Robert N. Weinreb, MD**, Distinguished Professor and Chair, and **Sally Baxter MD, MSc**, Assistant Professor, are evaluating and seeking to improve medication adherence of underrepresented minorities with glaucoma, a leading cause of blindness. The work is funded by R01MD014850 (Weinreb).

In collaboration with **Michael Pazzani, PhD**, (Distinguished Scientist at UC San Diego's Halıcıoğlu Data Science Institute), **Linda Zangwill, PhD**, Professor and interim Research Director and colleagues are employing deep learning models to determine whether a patient has glaucoma and how clinicians can use these results to manage glaucoma. In part, this work was funded through Dr. Pazzani's Defense Advanced Research Projects Agency (DARPA) grant "Explainable Machine Learning."