BIOGRAPHICAL SKETCH

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NAME: Rao Me, M.D.

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Heed Fellowship

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Kresge Eye Institute, Detroit, MI, USA	Ophthalmology Resident	07/2024	till present, complete at 06/2028	Ophthalmology Residency
Kresge Eye Institute, Detroit, MI, USA	Translational Research Fellow	02/2023	6/2024	Vitreoretinal Diseases Translational Research
Wayne State University, Detroit, MI, USA	Post-doctoral Research Fellow	09/2017	01/2023	Corneal Immunology Basic Research
Shanghai Jiaotong University School of Medicine, Shanghai, China	M.D.	09/2009	07/2017	Clinical Medicine

A. Personal Statement

My career goal is to achieve excellence in both clinical care and research in Ophthalmology. My academic training and research experience have provided me with a strong and diverse foundation in ocular immunology, corneal host defense mechanisms, and vitreoretinal disease pathophysiology.

During medical school, I participated in clinical and basic science studies on corneal surface diseases and myopia development, which cultivated my interest in ophthalmology research. After graduating, I pursued a postdoctoral research fellowship with Dr. Fu-Shin Yu, a world-renowned corneal research scholar in diabetic keratopathy and corneal infection. My research focused on corneal immunology, including establishing surgical murine models of infectious keratitis and identifying IL-36/IL-17 signaling pathways in innate immune host defense against bacterial and fungal keratitis. During this training, I acquired essential skills in basic research, microsurgery, independent project management, critical thinking, troubleshooting, scientific presentation, and formulating rigorous scientific questions. I subsequently completed a second postdoctoral research fellowship with the outstanding clinician-scientist Dr. Maryam Tahvildari, where I served in a leadership role conducting and directing projects focusing on adaptive immunity in corneal homeostasis. With this work, we identified the

role of regulatory T cells (Tregs) in maintaining the limbal stem cell niche and facilitating corneal wound healing.

During my translational research fellowship Kresge Eye Institute, I worked with the vitreoretinal surgeons Drs. Gary Abrams and Xihui Lin. My work focused on mitochondrial DNA damage and epigenetic modifications in diabetic macular edema, along with multi-omics approaches (proteomics, metabolomics) for studying diabetic retinopathy, retinal detachment, and endophthalmitis. This experience further enhanced both my research and clinical skills. I learned to lead projects, integrate clinical resources with basic science research, and coordinate across multidisciplinary teams and laboratories.

I am currently an ophthalmology resident with over eight years of research experience serving broad roles in multiple fields of ophthalmology. This has provided me with a deep knowledge of the eye and has prepared me in my goal to become a clinician-scientist in ophthalmology. My long-term career goal is to become a clinician scientist, establish an independent research program investigating the interplay between immunity, metabolism, and neurodegeneration in ocular diseases.

Me R, Gao N, Dai C, Yu FX. IL-17 Promotes Pseudomonas aeruginosa Keratitis in C57BL/6 Mouse Corneas. Journal of Immunology. 2020 Jan 1; 204(1):169-179.

Me R, Gao N, Zhang Y, Lee PSY, Wang J, Liu T, Standiford TJ, Mi QS, Yu FX. IL-36α Enhances Host Defense against Pseudomonas aeruginosa Keratitis in C57BL/6 Mouse Corneas. Journal of Immunology. 2021 Dec 1;207(11):2868-2877.

Tahvildari M, **Me R,** Setia M, Gao N, Suvas P, McClellan SA, Suvas S. Foxp3+ regulatory T cells reside within the corneal epithelium and co-localize with limbal stem cells. Exp Eye Res. 2024 Oct 11;249:110123.

Rao Me, Gary Abrams, Pooja Malaviya, Qi Sheng You, Jay Kumar, Xihui Lin, Renu A. Kowluru. 2025 Anti-VEGF Treatment and Mitochondrial DNA Damage in Diabetic Patients with Macular Edema 58th Retina Society Annual Meeting, Chicago

Me R, Yu, F.S. XihuiLin, 2024. The Proteomics os Subretinal FLuid in Rhegmatogenous Retinal Detatchment. Annual meeting of The Association for Research and Vision in Ophthalmology, Seattle

B. Positions, Scientific Appointments and Honors

Position and Scientific Appointments

2024-Present	Ophthalmology Resident, Kresge Eye Institute
2023-2024	Translational Research Fellow, Kresge Eye Institute
2017-2023	Postdoctoral Research Fellow, Wayne State University

Honors

2023	National Eye Institute Travel Grant, ARVO Annual Meeting
2018	First Place Prize, Poster Presentation, Kresge Eye Institute 5th Annual Vision Research
2013	Global REACH Scholarship, Shanghai Jiao Tong University School of Medicine

C. Contributions to Science

1 Medical School Research:
I contributed to clinical and translational studies on corneal refractive surgery, myopia, and corneal dystrophies. I investigated tear film instability, corneal aberrations in post-refractive surgery myopic patients, early detection of corneal dystrophy in pre-refractive surgery myopic patients, and scleral remodeling in myopia models. These studies established my foundational understanding of corneal biology and clinical ophthalmology.

Yuan Y, Li M, Chen Q, **Me R**, et al. Crosslinking Enzyme Lysyl Oxidase Modulates Scleral Remodeling in Form-Deprivation Myopia. Current Eye Research. 2018;43(2):200-207.

Li M, Yuan Y, Chen Q, **Me R**, et al. Expression of Wnt/β-Catenin Signaling Pathway and Its Regulatory Role in Type I Collagen with TGF-β1 in Scleral Fibroblasts from an Experimentally Induced Myopia Guinea Pig Model. Journal of Ophthalmology. 2016;2016:5126560.

Chen Q, Li M, Yuan Y, **Me R**, et al. Effects of Tear Film Lipid Layer Thickness and Blinking Pattern on Tear Film Instability After Corneal Refractive Surgery. Cornea. 2017;36(7):810-815.

Me R, Chao-Shern C, DeDionisio LA, et al. Post-LASIK Exacerbation of Granular Corneal Dystrophy Type 2 in Members of a Chinese Family. Eye. 2018;32(1):39-43.

2 Postdoctoral Research:

Elucidating IL-36 and IL-17 Signaling Pathways in Corneal Host Defense Against Bacterial and Fungal Keratitis
During my postdoctoral training with Dr. Fu-Shin Yu, I investigated the roles of IL-36 and IL-17 cytokines in corneal innate immunity against Pseudomonas aeruginosa and Candida albicans keratitis. I discovered that IL-36α enhances host defense by promoting antimicrobial responses and neutrophil recruitment, while IL-17 plays a pathogenic role in disease progression. I also characterized the opposing functions of IL-1Ra and IL-36Ra in regulating corneal inflammation. I also identified Lipocalin-2 (LCN2) as a critical mediator that bridges innate and adaptive immune responses during P. aeruginosa keratitis. These findings provided mechanistic insights into the balance between protective and pathologic innate inflammation in the cornea and identified potential therapeutic targets for infectious keratitis.

Me R, Gao N, Zhang Y, et al. IL-36α Enhances Host Defense against Pseudomonas aeruginosa Keratitis in C57BL/6 Mouse Corneas. Journal of Immunology. 2021;207(11):2868-2877.

Me R, Gao N, Dai C, Yu FX. IL-17 Promotes Pseudomonas aeruginosa Keratitis in C57BL/6 Mouse Corneas. Journal of Immunology. 2020;204(1):169-179.

Gao N, **Me R**, Dai C, Seyoum B, Yu FX. Opposing Effects of IL-1Ra and IL-36Ra on Innate Immune Response to Pseudomonas aeruginosa Infection in C57BL/6 Mouse Corneas. Journal of Immunology. 2018;201(2):688-699.

Dai C, **Me R**, Gao N, et al. Role of IL-36γ/IL-36R Signaling in Corneal Innate Defense Against Candida albicans Keratitis. Investigative Ophthalmology & Visual Science. 2021;62(6):10.

Me R, Yu FX. The Role of Lipocalin-2 in Pseudomonas aeruginosa Keratitis in C57BL/6 Mouse Corneas. ARVO Annual Meeting. 2023, Poster Presentation

Characterizing the Role of Regulatory T Cells in Limbal Stem Cell Niche and Corneal Homeostasis
During my postdoctoral work with Dr. Maryam Tahvildari, I contributed to the discovery that Foxp3+ regulatory T cells reside within the corneal epithelium and co-localize with limbal stem cells, suggesting a novel role for Tregs in maintaining the limbal stem cell niche and facilitating corneal wound healing.

Tahvildari M, **Me R**, Setia M, et al. Foxp3+ Regulatory T Cells Reside Within the Corneal Epithelium and Co-localize with Limbal Stem Cells. Experimental Eye Research. 2024;249:110123.

Advancing Multi-Omics and Translational Approaches to Understand Retinal and Vitreoretinal Diseases
As a translational research fellow, I have applied cutting-edge multi-omics technologies to characterize vitreoretinal diseases. I have led studies utilizing proteomics and metabolomics to analyze vitreous fluid in rhegmatogenous retinal detachment and have investigated the Warburg effect in proliferative diabetic

retinopathy. I am currently investigating mitochondrial DNA damage and epigenetic modifications in diabetic macular edema, with the goal of identifying novel biomarkers and therapeutic targets for vitreoretinal diseases.

Gregory A, Awad AM, Eltanani S, **Me R**, et al. Impact of the Warburg Effect on Nucleotide Homeostasis in Human Retinal Endothelial Cells and Its Relevance to Proliferative Diabetic Retinopathy. Frontiers in Pharmacology. 2025;16:1660067.

Naghdi A, Oska N, Yumnamcha T, **Me R**, et al. The Significance of Upper Glycolytic Components in Regulating Retinal Pigment Epithelial Cellular Behavior. Scientific Reports. 2024;14(1):18862.

Me R, Abrams G, Kowluru RA, et al. Anti-VEGF Treatment and Mitochondrial DNA Damage in Diabetic Patients with Macular Edema. 58th Retina Society Annual Meeting. 2025

Me R, Yu FX, Lin X. The Proteomics of Subretinal Fluid in Rhegmatogenous Retinal Detachment. ARVO Annual Meeting. 2024

Complete List of Published Work in My Bibliography: **27 peer reviewed publications**
URL: https://www.ncbi.nlm.nih.gov/myncbi/1DMdnIVDM0mA3K/bibliography/public/Make bibliography private

D. Scholastic Performance

YEAR	COURSE TITLE	GRADE
	SHANGHAI JIAOTONG UNIVERSITY SCHOOL OF MEDICINE	
2010	Molecular Biology, Genetics and Embryology	P
2011	Medical Microbiology and Parasitology	P
2012	Chemistry	P
2013	Pathology and Pathophysiology	P
2014	Systemic and Regional Anatomy	P
2015	Internal Medicine	P
2015	General Surgery	P
2016	Obstetrics and Gynecology, Pediatrics	P
2016	Psychiatry	P

Shanghai Jiaotong University School of Medicine courses are graded P (pass) or F (fail). Students must attend at least seven of the eight presentation/discussion sessions for credit.