

BIOGRAPHICAL SKETCH

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NAME: Haroon Rasheed

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
University of California, Los Angeles	B.S.	08/2015	06/2019	Bioengineering
University of California, Los Angeles	M.D.	06/2019	06/2023	Medical School
University of Southern California	Residency	06/2023	06/2027	Ophthalmology

A. Personal Statement

My path to ophthalmology began not in a clinic, but with a single TED Talk. Dr. David Eagleman’s “Can we create new senses for humans?” inspired me to pursue bioengineering, painting a future in which doctors and engineers would integrate emerging technologies with biology to expand the boundaries of human perception and overcome disease. At UCLA, I pursued these interests at the bench—first with Dr. Christina Charles, identifying novel protein biomarkers for rheumatoid arthritis, and then with Dr. Song Li, engineering biodegradable microneedle drug delivery platforms for periodontitis. However, these technologies still felt a step removed from the patients I saw during volunteer clinic shifts. I sought a field that combined the potential for technological advancement, engineering precision, and deep, direct patient care. I found that in ophthalmology.

Medical school opened the door to artificial intelligence, which would define my future research trajectory. As a first-year medical student, I attended a residency roundtable dinner where I learned that Dr. Shawn Lin, a fantastic cataract surgeon and a previous researcher in AI applications for ophthalmology, had joined the UCLA faculty. I sought out a meeting with him and spent the following months shadowing him in clinic and discussing how machine learning may transform the field. Through Dr. Lin, I connected with Dr. Joseph Caprioli, with whom I spent the next two years developing two novel deep learning systems for automated optic disc analysis. The first, RimNet, was one of the earliest models capable of segmenting incomplete neural rims in severe glaucoma. The second, DDLSNet, integrated disc size with RimNet to automate funduscopy grading of optic nerves using Dr. George Spaeth’s Disc Damage Likelihood Scale. Both systems demonstrated performance comparable to glaucoma specialists. Their associated papers were published in *Ophthalmology Science* and were presented at ARVO 2022. DDLSNet was additionally recognized as a Top 10 Invention of the Year by the UCLA Technology Development Group.

In parallel, I joined Dr. Edmund Tsui's lab to pursue a complementary line of imaging research. Together, we demonstrated that anterior segment optical coherence tomography could reliably quantify anterior chamber cells in pediatric uveitis patients. This was a proof of concept could imaging-based studies could augment. This work was published in the *American Journal of Ophthalmology* and presented at ARVO 2021. Across both Dr. Caprioli and Dr. Tsui's labs, I found a consistent theme: imaging in ophthalmology was ripe for automated analysis and clinical translation.

Alongside my research in medical school, a second motivation was taking shape, the seeds of which were planted during my work as a Physics Teaching Assistant in undergrad. While working with Dr. Lin and Dr. Tsui, I found the learning curve of ophthalmology to be particularly steep. Easily accessible education was sparse, and therefore I wanted to do something to fill this gap. I began contributing educational content through EyeGuru, scripting and narrating two widely viewed videos on OCT interpretation and Humphrey visual field analysis, and authored articles on uveitis grading and SUN criteria for Eyes on Eyecare, one of which has been accessed over 16,000 times. I would eventually find that a focus on education would become a strong pillar of my future research and career aspirations.

As I entered ophthalmology residency at USC, my interest in practical AI applications deepened. Within my first month, I had the opportunity to meet Dr. Michael Abramoff, who developed the first FDA-approved autonomous AI system for diabetic retinopathy screening. His encouragement to engage with AI not as a passive observer but as a physician-scientist who could shape its clinical integration came at a pivotal moment. I saw in our county hospital clinics the downstream consequences of delayed diagnosis, poor disease education, and limited specialist access. This motivated my collaboration with Dr. Benjamin Xu, validating the first AI-assisted glaucoma screening program for the Los Angeles Department of Health Services teleretinal program. Our deep learning algorithm approximated or exceeded the detection performance of ophthalmologists and optometrists in a safety-net population—findings published in *Ophthalmology Science* and presented as a podium talk I gave at ARVO 2024. Currently, we are examining intra-grader reliability of discs to better understand the errors inherent in human grading.

My interest in AI and education coalesced in residency, where I found residents across specialties using popular large language models for board preparation and learning about unfamiliar pathology. However, their educational utility remained poorly characterized. We addressed this directly by benchmarking state-of-the-art Gemini and ChatGPT models on ophthalmology board-style questions, a study published in *Ophthalmology Science*. It was during this point in time that we began doing weekly case-based education with Dr. Aaron Nagiel. I found these sessions riveting, and therefore pursued case-based education through conferences such as the Pacific Retina Club and the Atlantic Retina Club under the guidance of Dr. Aaron Nagiel. I began writing case reports with Drs. Itamar Livnat, Narsing Rao, and Brian Toy, including a rare presentation of Sjögren's syndrome-associated occlusive retinal vasculitis with trizonal autofluorescence findings, currently under submission.

The final dimension of my research portfolio has emerged from our residency program's early emphasis on retina and intravitreal pharmacotherapy. Our program's early integration of intravitreal injection training prompted me to investigate the risk profiles of sustained-release corticosteroid implants. I led a multivariate regression analysis of Phase 3 clinical trial data from the MEAD, HURON, and GENEVA studies to identify baseline patient characteristics predictive of clinically significant intraocular pressure elevation following dexamethasone implant. A MEAD-specific analysis has been submitted to *Retina*, with a companion abstract examining the pooled MEAD, HURON, and GENEVA cohort accepted to ARVO 2026. I am currently conducting a parallel analysis examining the efficacy of the fluocinolone acetonide intravitreal implant in the setting of retinal vein occlusions, extending this work to a broader range of indications and a longer-acting delivery platform.

The HEED Resident Retreat represents an opportunity to deepen the research and pedagogical foundation I have built across bioengineering, clinical medicine, and ophthalmology. I am eager to engage with a community of scholars and like-minded peers with whom I look forward to collaborating with in the future.

B. Positions, Scientific Appointments and Honors

President – Engineering Society UCLA, 2019

Top 10 Invention of the Year by UCLA's Technology Development Office – DDLSNet – 2022

Consult Resident of the Year, Los Angeles General Medical Center – 2024-2025

C. Contributions to Science

Development and Validation of a Deep learning Algorithm to Automate Detection of Referable glaucoma in a Safety Net Teleretinal Program

Haroon Rasheed, Sreenidhi Iyengar, Van Nguyen, ... , Benjamin Xu

>Abstract Accepted and Poster Presented at Healthcare DESCIPHER Symposium 2024

>Abstract Accepted and Podium Talk Presented at ARVO 2024

- Described a Deep Learning Model that approximated or exceeded performance of ophthalmologists and optometrists in detecting referable glaucoma in LA County patients.

Comparison of Deep Learning and Clinician Performance Detecting Referable Glaucoma from Fundus Photographs in a Safety Net Population

Van Nguyen, Sreenidhi Iyengar, Haroon Rasheed,, Benjamin Xu

>Paper published in Ophthalmology Science

- Developed and tested a deep learning algorithm for detecting referable glaucoma in the Los Angeles County that approximated or exceeded performance of ophthalmologist and optometrists

A Post Hoc Analysis of the Association of Baseline Characteristics and Intraocular Pressure Elevation with Dexamethasone Implant in Phase 3 MEAD Studies

Haroon Rasheed, Jodi Hwang, Tina Treece, Hongxin Lai, Brian Toy

>Paper Submitted to Retina

- Identified baseline patient characteristics associated with clinically-significant IOP elevation following dexamethasone implant for diabetic macular edema using multivariate regression analysis of the Phase 3 MEAD Studies

Association of Baseline Characteristics and IOP Elevation with Dexamethasone Implant in Phase 3 MEAD, HURON, and GENEVA Studies

Haroon Rasheed, Tina Treece, Jodi Hwang, Hongxin Lai, Brian Toy

>Abstract Accepted to ARVO 2026

- Identified baseline patient characteristics associated with clinically-significant IOP elevation following dexamethasone implant for diabetic macular edema, uveitic macular edema, and retinal vein occlusion using multivariate regression analysis of the Phase 3 MEAD, HURON, GENEVA Studies

Unnamed Fluocinolone Acetonide Study

Haroon Rasheed, Brian Toy

>Planned for Submission in Spring 2026

- Identifying efficacy of Fluocinolone Implants in RVO patients as compared to intravitreal dexamethasone

Case Report: Atypical Presentation of Sjogren's Syndrome-Associated Occlusive Retinal Vasculitis with Trizonal Autofluorescence Findings

Haroon Rasheed, Brian Toy, Itamar Livnat

>Planned for Submission to Ocular Immunology and Inflammation

Analysis of Intergrader Agreement for Cup-To-Disc Ratio Amongst Ophthalmologists

Haroon Rasheed, Van Nguyen, Benjamin Xu

>Paper planned for Submission in March 2026

- Analyzed variables that impacted intergrader agreement and disagreement amongst ophthalmologists when grading CDR of 1000 optic nerve head images

Comparative Performance of Gemini 3 Pro and GPT-5 Family Models on Ophthalmology Board-Style Questions

Ryan S Shean, Jayanth Kumar Mallapu, Tathya Shah, Haroon Adam Rasheed, David Younessi,...., Benjamin Xu

>Published in Ophthalmology Science

- Compared state-of-the-art Gemini and GPT models on 500 ophthalmology board-style questions. Gemini 3 Pro had the best general-purpose LLM performance.

Asymmetric Macular Degeneration in a Pediatric Patient

Haroon Rasheed, Aaron Nagiel

>Accepted to and Presented at Pacific Retina Club

- Presented a rare case of Claudin-19-Associated Maculopathy during Resident Case Presentation Session

Retinal Findings with Ataxia, Sensory Loss, and Gastroparesis

Haroon Rasheed, Aaron Nagiel

>Accepted to and Presented at Atlantic Retina Club

- Presented a rare case of Neuropathy, Ataxia, Retinitis Pigmentosa/Maternally-Inherited Leigh Syndrome Overlap during Case Presentations Session

DDLSNet: A novel deep learning-based system for grading funduscopy images for glaucomatous damage

Haroon Adam Rasheed, Tyler Davis, Esteban Morales, Zhe Fei, Lourdes Grassi, Agustina De Gainza, Kouros Nouri-Mahdavi, Joseph Caprioli

Manuscript Published in Ophthalmology Science - [Link](#)

Abstract Published in Investigative Ophthalmology & Visional Science (IOVS) - [Link](#)

Presented at ARVO 2022

- Trained, validated, and tested a novel computer vision AI model capable of automating diagnosis and grading of optic disc photos with glaucoma
- Showed that it matched glaucoma specialist performance in grading of optic disc photos for glaucomatous damage
- **Awarded 'Top 10 Invention of the Year' by UCLA Technology Development Group**

RimNet: A Deep Neural Network Pipeline for Automated Identification of the Optic Disc Rim

Haroon Adam Rasheed, Tyler Davis, Esteban Morales, Zhe Fei, Lourdes Grassi, Agustina De Gainza, Kouros Nouri-Mahdavi, Joseph Caprioli

Manuscript Published in Ophthalmology Science - [Link](#)

Abstract Published in Investigative Ophthalmology & Visional Science (IOVS) - [Link](#)

Presented at ARVO 2022

- Built, validated, and tested a novel computer vision AI model capable of high-accuracy accurate automated identification of the neural rim in optic disc photos
- One of the first computer vision models described in literature to be able to segment incomplete neural rims present in severe glaucoma
- Showed similar accuracy to glaucoma specialists in identifying neural rim

Method of IOL Power Calculation in the Second Eye of Patients With Previous Keratorefractive Surgery

Shawn R. Lin, Max Nutkiewicz, Haroon Rasheed, Mitra Nejad, D. Rex Hamilton

Published in Journal of Refractive Surgery - [Link](#)

- Described a novel method ('Delta K') for calculating intraocular lens power and showed it was comparable to widely used formulas for intraocular lens calculations

Quantification of Anterior Chamber Cells in Children with Uveitis Using Anterior Segment Optical Coherence Tomography

Edmund Tsui, Judy L Chen, Nicholas J Jackson, Omar Leyva, Haroon Rasheed, Elmira

Baghdasaryan, Simon S M Fung, Deborah K McCurdy, Srinivas R Sadda, Gary N Holland

Published in American Journal of Ophthalmology - [Link](#)

Abstract Published in Investigative Ophthalmology & Visional Science (IOVS) - [Link](#)

Presented at ARVO 2021

- Showed that anterior segment optical coherence tomography (AS-OCT) can be used to measure anterior chamber cells in children with excellent reliability between graders and acquisition modes

Gauging Public Interest in Eye Health Awareness Campaigns Via Internet Search Volumes

Chaiyaporn Vatanatham, Haroon Rasheed, Edmund Tsui

Presented at ASCRS 2021

- Demonstrated that eye health awareness months result in no significant increase in Google search volume for key phrases or words

A Thematic Analysis of the Role and Function of Online Uveitis Support Groups

Haroon Rasheed, Yusuf Rasheed, Shafee Syed-Quadri, Edmund Tsui

Published in Ocular Immunology and Inflammation

- A study that analyzed 32 online uveitis support groups including their activity, their membership count, and prevalent themes discussed across 337 posts.

Convolutional Neural Network Segmentation of Cup and Disk on Funduscopy Images

Haroon Rasheed, Esteban Morales, Agustina De Gainza, Joseph Caprioli

Presented at Josiah Brown Poster Fair 2020

- Demonstrated a high efficacy segmentation of the optic disc and cup using popular neural network framework 'U-Net'

Poly(lactic-co-glycolic acid) microneedle drug delivery system as a controlled release platform for treatment of periodontitis

Ricky Chen, Kate Christoferson, Jonathan Kuo, Kushal Pradhan, Haroon Rasheed, Willis Wung

Presented at 2019 Bioengineering Capstone Poster Fair

- Successfully showed a proof-of-concept biodegradable microneedle array as a novel drug delivery platform for treating periodontitis