Stanford



Sean Ku Wang, MD

Clinical Instructor, Ophthalmology

CLINICAL OFFICE (PRIMARY)

- **Stanford Byers Eye Institute**
  2452 Watson Ct
  Palo Alto, CA 94303
  Tel (650) 723-6995 **Fax** (650) 725-6619

Bio

BIO

Dr. Sean Ku Wang is a board-certified ophthalmologist and fellowship-trained retina specialist with Stanford Health Care and an Assistant Professor of Ophthalmology at Stanford University.

Dr. Wang specializes in treating diseases of the retina and macula, including age-related macular degeneration, diabetic retinopathy, central serous chorioretinopathy, and retinal vascular occlusions. He is committed to providing individualized, high-quality care to achieve the best possible outcomes for his patients.

Dr. Wang's research aims to accelerate the development of safe and effective genetic therapies. By integrating approaches from genetics, immunology, synthetic biology, computer science, and medicine, his lab seeks to discover and translate new treatments for human diseases with an emphasis on blinding disorders.

Dr. Wang has been recognized as a STAT Wunderkind, Forbes 30 Under 30, and a recipient of the American Society for Clinical Investigation Emerging-Generation Award and Burroughs Wellcome Fund Career Award for Medical Scientists among other honors.

CLINICAL FOCUS

- Retina Specialist

ACADEMIC APPOINTMENTS

- Clinical Instructor, Ophthalmology
- Faculty Fellow, Sarafan ChEM-H

HONORS AND AWARDS

- Career Award for Medical Scientists, Burroughs Wellcome Fund (2026)
- Emerging-Generation Award, American Society for Clinical Investigation (2026)

- Young Scientist Retina Research Grant, Juliette RP Vision Foundation (2024)
- AUPO/RPB Resident and Fellow Research Forum, Association of University Professors of Ophthalmology (2024)
- Career-Starter Research Grant, Knights Templar Eye Foundation (2023)
- Healthcare 30 Under 30, Forbes (2021)
- National Eye Institute T32 Postdoctoral Fellowship, Stanford University (2021)
- STAT Wunderkind, STAT News (2020)
- Elizabeth D. Hay Prize for Basic Science Research, Harvard Medical School (2019)
- HHMI Medical Research Fellowship, Howard Hughes Medical Institute (2018)
- J.E. Wallace Sterling Award for Scholastic Achievement, Stanford University (2014)

PROFESSIONAL EDUCATION

- Board Certification, American Board of Ophthalmology (2026)
- Fellowship, Massachusetts Eye and Ear, Harvard Medical School (2026)
- Residency, Byers Eye Institute at Stanford (2025)
- Postdoc, Stanford University (2025)
- M.D., Harvard Medical School (2020)
- B.S., Stanford University (2014)

LINKS

- Lab website: https://seanwanglab.org/
- X: https://x.com/SeanKuWang

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Immune Response to Viral Vectors:

Viral vectors such as adeno-associated virus (AAV) hold tremendous promise for treating genetic diseases. However, candidate AAV therapies have struggled to overcome dose-limiting immune responses, the underlying mechanisms for which are still unclear. We are investigating the cell types and pathways responsible for AAV-induced inflammation, with the goal of improving the safety and durability of gene therapy.

Synthetic Promoters for Gene Therapy:

Precise cell type targeting is critical for many gene therapy applications, yet engineering vectors that drive strong and specific expression remains challenging. Using multi-omics and artificial intelligence, we are designing new sequences to control gene activity, enabling robust expression in disease-relevant cell types while minimizing off-target effects.

RNA Engineering and Delivery:

RNA therapies have demonstrated success as vaccines and gene-silencing drugs, but their potential for gene editing and protein replacement is still being realized. We are exploring emerging RNA modalities and delivery systems with the aim of translating them into therapeutics and expanding the toolkit for non-viral gene therapy.

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neurosciences (PhD Program)

Publications

PUBLICATIONS

- **Artificial intelligence-guided engineering of precision ocular therapeutics.** *Current opinion in ophthalmology*
  Sayana, R., Wang, S. K., Ting, D. S., Guo, L. Y.
  2026

- **RNA delivery to the corneal endothelium using charge-altering releasable transporters.** *Science advances*
  Wang, S. K., Li, Z., Shah, S. H., Edwards, Q. A., Bouffard, R., Hines, E. S., Imventarza, J. A., Korte, S., Lawrence, M. S., Song, E., Helmy, E., Amaya, L., Kang, et al
  2026; 12 (34): eady8161

- **Multiomics and deep learning dissect regulatory syntax in human development.** *Nature*
  Liu, B. B., Jessa, S., Kim, S. H., Ng, Y. T., Higashino, S. I., Marinov, G. K., Chen, D. C., Parks, B. E., Li, L., Nguyen, T. C., Wang, A. T., Wang, S. K., Tan, et al
  2026

- **P-Score Variability as a Function of Retinopathy of Prematurity Severity.** *Investigative ophthalmology & visual science*
  Shah, S. V., Brant, A. R., Zhao, C. S., Wang, S. K., Lin, J. B., Koo, E., Cakir, B., Deboer, C. M., Ahya, A., Wallace, H., Moshfeghi, D. M.
  2026; 67 (2): 59

- **Deep learning-guided design of cell type-specific AAV promoters.** *bioRxiv : the preprint server for biology*
  Wang, S. K., Deng, B., Nair, S., Ren, X., Li, J., Tijerina, J., Prakhar, P., Luo, Z., Nnebe, C., Kim, S. H., Zhou, Y., Shah, S. H., Davis, et al
  2026

- **Single-cell multiome and enhancer connectome of human retinal pigment epithelium and choroid nominate causal variants in macular degeneration.** *Cell reports*
  Wang, S. K., Li, J., Nair, S., Kosaraju, R., Chen, Y., Zhang, Y., Kundaje, A., Liu, Y., Wang, N., Chang, H. Y.
  2026; 45 (1): 116814

- **Genetic elements promote retention of extrachromosomal DNA in cancer cells.** *Nature*
  Sankar, V., Hung, K. L., Gnanasekar, A., Wong, I. T., Shi, Q., Kraft, K., Jones, M. G., He, B. J., Yan, X., Belk, J. A., Liu, K. J., Agarwal, S., Wang, et al
  2025

- **Discrete Immolative Guanidinium Transporters deliver mRNA to specific organs and red blood cells.** *Nature communications*
  Li, Z., Ee, A., Amaya, L., Hamad, J. L., Yadav, P. K., Wang, S. K., Chang, H. Y., Wender, P. A.
  2025; 16 (1): 7055

- **ERG responses to high-frequency flickers require FAT3 signaling in mouse retinal bipolar cells.** *The Journal of general physiology*
  Avilés, E. C., Wang, S. K., Patel, S., Cordero, S., Shi, S., Lin, L., Kefalov, V. J., Goodrich, L. V., Cepko, C. L., Xue, Y.
  2025; 157 (2)

- **Transcriptomics of optic nerve regeneration** *Proteomics, Multi-Omics and System Biology in Optic Nerve Regeneration*
  Wang, S. K.
  2025

- **Linking Iris Cis-Regulatory Variants to Primary Angle-Closure Glaucoma Via Clinical Imaging and Multiomics.** *Investigative ophthalmology & visual science*
  Li, J., Chen, Y., Wang, W., Zhang, Y., Su, G., Wang, S. K., Zhang, Y., Yao, Y., Wu, S., Lu, W., Zhang, K., Qiao, C., Li, et al
  2024; 65 (14): 18

- **Comparing a Head-Mounted Smartphone Visual Field Analyzer to Standard Automated Perimetry in Glaucoma: A Prospective Study.** *Journal of glaucoma*

Wang, S. K., Tran, E. M., Yan, W., Kosaraju, R., Sun, Y., Chang, R. T.
2024

- **Organ- and Cell-Selective Delivery of mRNA In Vivo Using Guanidinylated Serinol Charge-Altering Releasable Transporters.** *Journal of the American Chemical Society*
  Li, Z., Amaya, L., Ee, A., Wang, S. K., Ranjan, A., Waymouth, R. M., Chang, H. Y., Wender, P. A.
  2024
- **Ocular Ischemic Syndrome in the Setting of Normal Carotid Duplex Ultrasound.** *Retinal cases & brief reports*
  Ghoraba, H. H., Yu, M., Yu, G., Wang, S., Or, C., Karaca, I., Nguyen, Q. D.
  2023
- **Charge-altering releasable transporters enhance mRNA delivery in vitro and exhibit in vivo tropism.** *Nature communications*
  Li, Z., Amaya, L., Pi, R., Wang, S. K., Ranjan, A., Waymouth, R. M., Blish, C. A., Chang, H. Y., Wender, P. A.
  2023; 14 (1): 6983
- **Telemedicine retinopathy of prematurity severity score (TeleROP-SS) versus modified activity score (mROP-ActS) retrospective comparison in SUNDROP cohort.** *Scientific reports*
  Xu, C. L., Adu-Brimpong, J., Moshfeghi, H. P., Rosenblatt, T. R., Yu, M. D., Ji, M. H., Wang, S. K., Zaidi, M., Ghoraba, H., Michalak, S., Callaway, N. F., Kumm, J., Nudleman, et al
  2023; 13 (1): 15219
- **Chromophore supply modulates cone function and survival in retinitis pigmentosa mouse models.** *Proceedings of the National Academy of Sciences of the United States of America*
  Xue, Y., Sun, X., Wang, S. K., Collin, G. B., Kefalov, V. J., Cepko, C. L.
  2023; 120 (23): e2217885120
- **Effective field of view of wide-field fundus photography in the Stanford University Network for Diagnosis of Retinopathy of Prematurity (SUNDROP).** *Scientific reports*
  Ji, M. H., Zaidi, M., Bodnar, Z., Wang, S. K., Kumm, J., Moshfeghi, D. M.
  2022; 12 (1): 19276
- **Single-cell multiome of the human retina and deep learning nominate causal variants in complex eye diseases.** *Cell genomics*
  Wang, S. K., Nair, S., Li, R., Kraft, K., Pampari, A., Patel, A., Kang, J. B., Luong, C., Kundaje, A., Chang, H. Y.
  2022; 2 (8)
- **Engineering circular RNA for enhanced protein production.** *Nature biotechnology*
  Chen, R., Wang, S. K., Belk, J. A., Amaya, L., Li, Z., Cardenas, A., Abe, B. T., Chen, C., Wender, P. A., Chang, H. Y.
  2022
- **Modeling absolute zone size in retinopathy of prematurity in relation to axial length.** *Scientific reports*
  Wang, S. K., Korot, E., Zaidi, M., Ji, M. H., Al-Moujahed, A., Callaway, N. F., Kumm, J., Moshfeghi, D. M.
  2022; 12 (1): 4717
- **Targeting Microglia to Treat Degenerative Eye Diseases.** *Frontiers in immunology*
  Wang, S. K., Cepko, C. L.
  2022; 13: 843558
- **Augmentation of CD47-SIRPalpha signaling protects cones in genetic models of retinal degeneration.** *JCI insight*
  Wang, S. K., Xue, Y., Cepko, C. L.
  2021
- **AAV-Txnip prolongs cone survival and vision in mouse models of retinitis pigmentosa** *ELIFE*
  Xue, Y., Wang, S. K., Rana, P., West, E. R., Hong, C. M., Feng, H., Wu, D. M., Cepko, C. L.
  2021; 10
- **Engineering adeno-associated viral vectors to evade innate immune and inflammatory responses** *SCIENCE TRANSLATIONAL MEDICINE*
  Chan, Y., Wang, S. K., Chu, C. J., Copland, D. A., Letizia, A. J., Verdera, H., Chiang, J. J., Sethi, M., Wang, M. K., Neidermyer, W. J., Chan, Y., Lim, E. T., Graveline, et al
  2021; 13 (580)

- **Nrf2 overexpression rescues the RPE in mouse models of retinitis pigmentosa** *JCI INSIGHT*
  Wu, D. M., Ji, X., Ivanchenko, M., Chung, M., Piper, M., Rana, P., Wang, S. K., Xue, Y., West, E., Zhao, S. R., Xu, H., Cicconet, M., Xiong, et al
  2021; 6 (2)

- **In Situ Detection of Adeno-associated Viral Vector Genomes with SABER-FISH** *MOLECULAR THERAPY-METHODS & CLINICAL DEVELOPMENT*
  Wang, S. K., Lapan, S. W., Hong, C. M., Krause, T. B., Cepko, C. L.
  2020; 19: 376-386

- **Microglia modulation by TGF-beta 1 protects cones in mouse models of retinal degeneration** *JOURNAL OF CLINICAL INVESTIGATION*
  Wang, S. K., Xue, Y., Cepko, C. L.
  2020; 130 (8): 4360-4369

- **Meeting the need for corrective spectacles in visually impaired Chinese school children: the potential of ready-made spectacles** *BRITISH JOURNAL OF OPHTHALMOLOGY*
  Zhu, Z., Ellwein, L. B., Wang, S. K., Zhao, J., He, M.
  2019; 103 (8): 1106-1111

- **Circumventing cellular immunity by miR142-mediated regulation sufficiently supports rAAV-delivered OVA expression without activating humoral immunity** *JCI INSIGHT*
  Xiao, Y., Muhuri, M., Li, S., Qin, W., Xu, G., Luo, L., Li, J., Letizia, A. J., Wang, S. K., Chan, Y., Wang, C., Fuchs, S. P., Wang, et al
  2019; 4 (13)

- **Soluble CX3CL1 gene therapy improves cone survival and function in mouse models of retinitis pigmentosa** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Wang, S. K., Xue, Y., Rana, P., Hong, C. M., Cepko, C. L.
  2019; 116 (20): 10140-10149

- **AAV cis-regulatory sequences are correlated with ocular toxicity** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Xiong, W., Wu, D. M., Xue, Y., Wang, S. K., Chung, M. J., Ji, X., Rana, P., Zhao, S. R., Mai, S., Cepko, C. L.
  2019; 116 (12): 5785-5794

- **Mineralocorticoid Receptor Antagonists in Central Serous Chorioretinopathy: A Meta-Analysis of Randomized Controlled Trials.** *Ophthalmology. Retina*
  Wang, S. K., Sun, P., Tandias, R. M., Seto, B. K., Arroyo, J. G.
  2019; 3 (2): 154-160

- **Incidence of and Factors Associated With Myopia and High Myopia in Chinese Children, Based on Refraction Without Cycloplegia** *JAMA OPHTHALMOLOGY*
  Wang, S. K., Guo, Y., Liao, C., Chen, Y., Su, G., Zhang, G., Zhang, L., He, M.
  2018; 136 (9): 1017-1024

- **Qualitative and quantitative assessment of posterior segment optical coherence tomography images using standard photos: the Liwan Eye Study** *BMJ OPEN*
  Wang, S. K., Guo, X., Xiao, O., Chen, Y., Liu, R., Huang, W., He, M.
  2017; 7 (12): e017923

- **Trends in Hospitalization and Incidence Rate for Syphilitic Uveitis in the United States from 1998-2009.** *American journal of ophthalmology*
  Albini, T., Callaway, N. F., Pershing, S., Wang, S. K., Moshfeghi, A. A., Moshfeghi, D. M.
  2017

- **Comparison of Peristat Online Perimetry with the Humphrey Perimetry in a Clinic-Based Setting** *TRANSLATIONAL VISION SCIENCE & TECHNOLOGY*
  Lowry, E. A., Hou, J., Hennein, L., Chang, R. T., Lin, S., Keenan, J., Wang, S. K., Ianchulev, S., Pasquale, L. R., Han, Y.
  2016; 5 (4)

- **Hoxb5 marks long-term haematopoietic stem cells and reveals a homogenous perivascular niche** *NATURE*
  Chen, J. Y., Miyanishi, M., Wang, S. K., Yamazaki, S., Sinha, R., Kao, K. S., Seita, J., Sahoo, D., Nakauchi, H., Weissman, I. L.
  2016; 530 (7589): 223-?

- **SUNDROP: six years of screening for retinopathy of prematurity with telemedicine.** *Canadian journal of ophthalmology. Journal canadien d'ophtalmologie*
  Wang, S. K., Callaway, N. F., Wallenstein, M. B., Henderson, M. T., Leng, T., Moshfeghi, D. M.
  2015; 50 (2): 101-106
- **Expression of glypican 3 enriches hepatocellular carcinoma development-related genes and associates with carcinogenesis in cirrhotic livers** *CARCINOGENESIS*
  Liu, X., Wang, S. K., Zhang, K., Zhang, H., Pan, Q., Liu, Z., Pan, H., Xue, L., Yen, Y., Chu, P. G.
  2015; 36 (2): 232-242
- **Gender differences in compensation in academic medicine: the results from four neurological specialties within the University of California Healthcare System** *SCIENTOMETRICS*
  Henderson, M. T., Fijalkowski, N., Wang, S. K., Maltenfort, M., Zheng, L. L., Ratliff, J., Moshfeghi, A. A., Moshfeghi, D. M.
  2014; 100 (1): 297-306
- **Stanford University Network for Diagnosis of Retinopathy of Prematurity (SUNDROP): five years of screening with telemedicine.** *Ophthalmic surgery, lasers & imaging retina*
  Fijalkowski, N., Zheng, L. L., Henderson, M. T., Wang, S. K., Wallenstein, M. B., Leng, T., Moshfeghi, D. M.
  2014; 45 (2): 106-113
- **An emerging treatment option for glaucoma: Rho kinase inhibitors.** *Clinical ophthalmology (Auckland, N.Z.)*
  Wang, S. K., Chang, R. T.
  2014; 8: 883-890
- **Discovery and diagnostic value of a novel oncofetal protein: glypican 3.** *Advances in anatomic pathology*
  Wang, S. K., Zynger, D. L., Hes, O. n., Yang, X. J.
  2014; 21 (6): 450–60
- **A new paradigm for incorporating the joint statement screening guidelines for retinopathy of prematurity into clinical practice: outcomes from a quaternary referral program.** *Ophthalmic surgery, lasers & imaging retina*
  Henderson, M. T., Wang, S. K., Moshfeghi, D. M.
  2013; 44 (5): 442-447