Stanford

Ximena Corso Díaz

Assistant Professor of Ophthalmology

Bio

BIO

Ximena is an Assistant Professor in the Department of Ophthalmology at Stanford University. She completed her undergraduate studies in Biology at Universidad de los Andes in Bogotá, Colombia. She obtained her M.Sc. in Neuroscience from the University of Alberta in Edmonton, Canada, and her Ph.D. in Genetics from the University of British Columbia, Vancouver, Canada, studying the roles of the neural stem cell transcription factor NR2E1 in retinal development. She then joined the National Eye Institute to study the epigenetic control of development and aging in rod photoreceptors, the retina's primary light-sensing neurons. Supported by a K99 career development award, she later focused on how RNA-binding proteins regulate gene expression in photoreceptors. In her lab, Ximena investigates how RNA-binding proteins and regulatory RNAs function in retinal development, aging, and disease to identify new therapeutic strategies to combat neurodegeneration and vision loss.

ACADEMIC APPOINTMENTS

- Assistant Professor, Ophthalmology
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Genentech Career Development Award for Emerging Vision Scientists, ARVO (2025)
- Gabilan Fellowship, Stanford University (2024)
- NEI Director's Award- Eye on the Future Team, National Eye Institute (2023)
- K99 Pathway to Independence Award, National Eye Institute (2020)
- NEI Director's Award- In recognition to receiving an external grant through a competitive process, National Eye Institute (2020)
- NEI Director's Award- Rising star, National Eye Institute (2020)
- NEI Director's Award- Spotlight on mentorship award, National Eye Institute (2020)
- Connie Lee Lerea Travel Grant, The Association for research in vision and ophthalmology (ARVO) (2018)
- Fellows Award for Research Excellence (FARE) Travel Grant, OITE, National Institutes of Health (2018)
- Graduate studentship award, Child and Family Research Institute (CFRI) (2010)
- Provost Doctoral Entrance Award, University of Alberta (2007)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Editorial board member, Molecular Vision (2025 - present)

PROFESSIONAL EDUCATION

- PhD, University of British Columbia , Genetics
- MSc, University of Alberta , Neuroscience
- BS, Universidad de los Andes , Biology

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

We are interested in unraveling the roles of RNA-binding proteins (RBPs) and regulatory RNAs in retinal development and homeostasis.

RNA-binding proteins mediate functional integration of transcriptional and post-transcriptional machineries influencing various aspects of gene expression and RNA metabolism. Several RBPs have cell-type enriched expression patterns in the retina or cause blinding diseases, however their role in retinal development and function is poorly understood. We have identified several RBPs that interact with the photoreceptor-specific transcription factor NRL and are likely involved in development and homeostasis of this retinal cell-type. We are pursuing the following lines of research:

1) RBPs in retinal development and degeneration. We will study the role of RBPs in regulating retinal development and maintaining homeostasis. We will focus on RBPs enriched in the retina, their interactions with retinal transcription factors like NRL, and their relevance to retinal diseases.

2) RBPs in R-loop regulation in the retina. R-loops are triple-stranded structures created when RNA anneals to one of the strands of the DNA duplex. R-loops have many regulatory roles during gene expression and their dysregulation can be detrimental to genome integrity. We observed that R-loops are dynamic during retinal development and identified key R-loop-associated RBPs that are enriched in rod photoreceptors and that interact with the transcription factor NRL. We will study the role of R-loops and their regulatory RBPs in retinal development and homeostasis.

3) Chromatin-associated regulatory RNAs through the retina lifespan. Chromatin-associated RNAs contribute to the dynamic regulation of gene expression, chromatin structure, and genome organization, playing essential roles in various biological processes, including development, differentiation, and disease. We will study how regulatory RNAs, together with their cognate RBPs, influence expression programs and chromatin dynamics through the retina lifespan.

Teaching

COURSES

2025-26

- Seeing Again: Unlocking the Epigenome to Rejuvenate Retinal Neurons?: OPHT 12N (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Shruti Singh Kakan

Publications

PUBLICATIONS

- **Regulation of neuronal transcription by RNA-binding proteins via R-loop dynamics.** *Neural regeneration research*
  Kakan, S. S., Corso-Diaz, X.

2026

- **Maf-family bZIP transcription factor NRL interacts with RNA-binding proteins and R-loops in retinal photoreceptors.** *eLife*
  Corso Diaz, X., Liang, X., Preston, K., Tegshee, B., English, M. A., Nellissery, J., Yadav, S. P., Marchal, C., Swaroop, A.
  2025; 13

- **Maf-family bZIP transcription factor NRL interacts with RNA-binding proteins and R-loops in retinal photoreceptors.** *bioRxiv : the preprint server for biology*
  Corso-Díaz, X., Liang, X., Preston, K., Tegshee, B., English, M. A., Nellissery, J., Yadav, S. P., Marchal, C., Swaroop, A.
  2024

- **QTL mapping of human retina DNA methylation identifies 87 gene-epigenome interactions in age-related macular degeneration.** *Nature communications*
  Advani, J., Mehta, P. A., Hamel, A. R., Mehrotra, S., Kiel, C., Strunz, T., Corso-Díaz, X., Kwicklis, M., van Asten, F., Ratnapriya, R., Chew, E. Y., Hernandez, D. G., Montezuma, et al
  2024; 15 (1): 1972

- **The photoreceptor-specific transcription factor NRL interacts with RNA-binding proteins and regulates R-loop levels**
  Diaz, X., Dandewad, V., Liang, X., Preston, K., Swaroop, A.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2023

- **High-resolution genome topology of human retina uncovers super enhancer-promoter interactions at tissue-specific and multifactorial disease loci.** *Nature communications*
  Marchal, C., Singh, N., Batz, Z., Advani, J., Jaeger, C., Corso-Díaz, X., Swaroop, A.
  2022; 13 (1): 5827

- **HiCRes: a computational method to estimate and predict the genomic resolution of Hi-C libraries.** *Nucleic acids research*
  Marchal, C., Singh, N., Corso-Díaz, X., Swaroop, A.
  2022; 50 (6): e35

- **Aging of the Retina: Molecular and Metabolic Turbulences and Potential Interventions.** *Annual review of vision science*
  Campello, L., Singh, N., Advani, J., Mondal, A. K., Corso-Díaz, X., Swaroop, A.
  2021; 7: 633-664

- **Genome wide mapping of promoter-anchored interactions in the human retina**
  Singh, N., Marchal, C., Gentry, J., Jaeger, C., Corso-Diaz, X., Swaroop, A.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2020

- **Genome-wide Profiling Identifies DNA Methylation Signatures of Aging in Rod Photoreceptors Associated with Alterations in Energy Metabolism.** *Cell reports*
  Corso-Díaz, X., Gentry, J., Rebernick, R., Jaeger, C., Brooks, M. J., van Asten, F., Kooragayala, K., Gieser, L., Nellissery, J., Covian, R., Cogliati, T., Mondal, A. K., Jiang, et al
  2020; 31 (3): 107525

- **Epigenetic control of gene regulation during development and disease: A view from the retina.** *Progress in retinal and eye research*
  Corso-Díaz, X., Jaeger, C., Chaitankar, V., Swaroop, A.
  2018; 65: 1-27

- **Epigenetic disease mechanisms associated with age-related macular degeneration**
  Van Asten, F., Diaz, X., Chaitankar, V., Ratnapriya, R., Starostik, M., Chew, E. Y., Ferrington, D. A., Swaroop, A.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2018

- **Epigenomic reconfiguration during aging of rod photoreceptors**
  Diaz, X., Rebernick, R., Jaeger, C., Van Asten, F., Brooks, M., Cogliati, T., Chaitankar, V., Swaroop, A.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2018

- **Transcriptional and DNA methylation changes during aging in rod photoreceptors**
  Diaz, X., Van Asten, F., Cogliati, T., Barb, J., Gotoh, N., Brooks, M., Swaroop, A.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2017

- **Co-activator candidate interactions for orphan nuclear receptor NR2E1.** *BMC genomics*

Corso-Díaz, X., de Leeuw, C. N., Alonso, V., Melchers, D., Wong, B. K., Houtman, R., Simpson, E. M.
2016; 17 (1): 832

- **Combined serial analysis of gene expression and transcription factor binding site prediction identifies novel-candidate-target genes of Nr2e1 in neocortex development.** *BMC genomics*
  Schmouth, J. F., Arenillas, D., Corso-Díaz, X., Xie, Y. Y., Bohacec, S., Banks, K. G., Bonaguro, R. J., Wong, S. H., Jones, S. J., Marra, M. A., Simpson, E. M., Wasserman, W. W.
  2015; 16 (1): 545

- **Nr2e1 regulates retinal lamination and the development of Müller glia, S-cones, and glycineric amacrine cells during retinogenesis.** *Molecular brain*
  Corso-Díaz, X., Simpson, E. M.
  2015; 8: 37

- **Absence of NR2E1 mutations in patients with aniridia.** *Molecular vision*
  Corso-Díaz, X., Borrie, A. E., Bonaguro, R., Schuetz, J. M., Rosenberg, T., Jensen, H., Brooks, B. P., Macdonald, I. M., Pasutto, F., Walter, M. A., Grønskov, K., Brooks-Wilson, A., Simpson, et al
  2012; 18: 2770-82

- **Modelling human regulatory variation in mouse: finding the function in genome-wide association studies and whole-genome sequencing.** *PLoS genetics*
  Schmouth, J. F., Bonaguro, R. J., Corso-Diaz, X., Simpson, E. M.
  2012; 8 (3): e1002544

- **nNOS alpha and nNOS beta localization to aggresome-like inclusions is dependent on HSP90 activity.** *Journal of neurochemistry*
  Corso-Díaz, X., Krukoff, T. L.
  2010; 114 (3): 864-72