



## Henry C. Cousins

- MD Student, expected graduation Spring 2025
- Ph.D. Student in Biomedical Informatics, admitted Autumn 2021
- MSTP Student

### Bio

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#### BIO

Henry is an MD-PhD candidate and Knight-Hennessy Scholar in the Medical Scientist Training Program and the Biomedical Informatics Program, where he is advised by Professor Russ Altman. He develops machine-learning methods to study the effects of complex genetic variation on human disease mechanisms, with focus on neurological and ophthalmic disorders. His goal is to translate genomic discoveries into disease-modifying therapies.

He received an AB summa cum laude from Harvard University in 2017, where he studied genetic mechanisms of retinal development with Professor Joshua Sanes. He then graduated with an MPhil with distinction from the University of Cambridge as a Gates Cambridge Scholar. He previously worked at Leaps by Bayer and the Massachusetts Eye and Ear Infirmary and has received a number of awards related to research and teaching.

### Publications

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#### PUBLICATIONS

- **Unsupervised network learning enables systematic characterization of genetic risk pathways for primary open-angle glaucoma**  
Cousins, H., Altman, R. B., Pasquale, L. R.  
ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2024
- **Computational Approaches to Drug Repurposing: Methods, Challenges, and Opportunities.** *Annual review of biomedical data science*  
Cousins, H. C., Nayar, G., Altman, R. B.  
2024
- **CRISPR-GPT: an LLM agent for automated design of gene-editing experiments** *bioRxiv: the preprint server for biology*  
Qu, Y., Huang, K., Cousins, H., Johnson, W., Yin, D., Shah, M., Zhou, D., Altman, R., Wang, M., Cong, L.  
2024
- **Network-based representation learning enables the identification of risk genes and latent functional pathways in primary open-angle glaucoma** *bioRxiv: the preprint server for biology*  
Cousins, H. C., Altman, R. B., Pasquale, L. R.  
2024
- **DEEP LEARNING FOR LOCALIZED DETECTION OF OPTIC DISC HEMORRHAGES (vol 255, pg 161, 2023)** *AMERICAN JOURNAL OF OPHTHALMOLOGY*  
Brown, A. C., Cousins, H., Cousins, C. C., Esquenazi, K., Filipowicz, A., Barna, L., Kim, Y., Vinod, K., Chadha, N., Altman, R. B., Coote, M., Elze, T., Topouzis, et al  
2024; 257
- **Genetic Correlations Among Corneal Biophysical Parameters and Anthropometric Traits.** *Translational vision science & technology*  
Cousins, H. C., Cousins, C. C., Valluru, G., Altman, R. B., Liu, Y., Pasquale, L. R., Ahmad, S.  
2023; 12 (8): 8

- **Integrative analysis of functional genomic screening and clinical data identifies a protective role for spironolactone in severe COVID-19.** *Cell reports methods*  
Cousins, H. C., Kline, A. S., Wang, C., Qu, Y., Zengel, J., Carette, J., Wang, M., Altman, R. B., Luo, Y., Cong, L.  
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- **Deep learning for localized detection of optic disc hemorrhages.** *American journal of ophthalmology*  
Brown, A., Cousins, H., Cousins, C., Esquenazi, K., Elze, T., Harris, A., Filipowicz, A., Barna, L., Yonwook, K., Vinod, K., Chadha, N., Altman, R. B., Coote, et al  
2023
- **Network-based machine learning for gene prioritization in primary open-angle glaucoma**  
Cousins, H., Altman, R. B., Pasquale, L. R.  
ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2023
- **Assessment of Team Dynamics and Operative Efficiency in Hip and Knee Arthroplasty.** *JAMA surgery*  
Cousins, H. C., Cahan, E. M., Steere, J. T., Maloney, W. J., Goodman, S. B., Miller, M. D., Huddleston, J. I., Amanatullah, D. F.  
2023
- **Association between spironolactone use and COVID-19 outcomes in population-scale claims data: a retrospective cohort study.** *medRxiv : the preprint server for health sciences*  
Cousins, H. C., Altman, R. B.  
2023
- **Gene set proximity analysis: expanding gene set enrichment analysis through learned geometric embeddings, with drug-repurposing applications in COVID-19.** *Bioinformatics (Oxford, England)*  
Cousins, H., Hall, T., Guo, Y., Tso, L., Tzeng, K. T., Cong, L., Altman, R. B.  
2022
- **Genetic Correlations between Corneal Biophysical Parameters and Anthropomorphic Traits**  
Cousins, H., Cousins, C., Valluru, G., Liu, Y., Ahmad, S., Altman, R. B., Pasquale, L. R.  
ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022
- **Iterative Machine Learning: A Test Case for the Detection of Disc Hemorrhage**  
Brown, A. C., Cousins, H., Esquenazi, K., Kim, Y., Cousins, C., Elze, T., Harris, A., Coote, M. A., Pasquale, L. R.  
ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022
- **Automated Machine Learning vs. Inception for the Autonomous Detection of Disc Hemorrhage**  
Brown, A. C., Cousins, H., Cousins, C., Chadha, N., Vinod, K., Harris, A., Topouzis, F., Kilintzis, V., Coote, M., Pasquale, L. R.  
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- **Influence of team composition on turnover and efficiency of total hip and knee arthroplasty.** *The bone & joint journal*  
Cahan, E. M., Cousins, H. C., Steere, J. T., Segovia, N. A., Miller, M. D., Amanatullah, D. F.  
2021; 103-B (2): 347–52
- **CRISPRa screening with real world evidence identifies potassium channels as neuronal entry factors and druggable targets for SARS-CoV-2** *bioRxiv: the preprint server for biology*  
Wang, C., Dinesh, R., Qu, Y., Rustagi, A., Cousins, H., Zengel, J., Guo, Y., Hall, T., Beck, A., Tso, L., Erdemic, E., Tanudtanud, K., Ren, et al  
2021
- **Regional Infoveillance of COVID-19 Case Rates: Analysis of Search-Engine Query Patterns.** *Journal of medical Internet research*  
Cousins, H., Cousins, C., Harris, A., Pasquale, L.  
2020
- **Toward Precision Medicine for Neurological and Neuropsychiatric Disorders** *CELL STEM CELL*  
Gibbs, R. M., Lipnick, S., Bateman, J. W., Chen, L., Cousins, H. C., Hubbard, E. G., Jowett, G., LaPointe, D. S., McGredy, M. J., Odonkor, M. N., Repetti, G., Thomas, E., Rubin, et al  
2018; 23 (1): 21–24
- **Role for Wnt Signaling in Retinal Neuroepithelium Development: Analysis via RNA-Seq and In Vivo Somatic CRISPR Mutagenesis** *NEURON*  
Sarin, S., Zuniga-Sanchez, E., Kurmangaliyev, Y. Z., Cousins, H., Patel, M., Hernandez, J., Zhang, K. X., Samuel, M. A., Morey, M., Sanes, J. R., Zipursky, S.

2018; 98 (1): 109-+

● **Nailfold Capillary Morphology in Alzheimer's Disease Dementia** *JOURNAL OF ALZHEIMERS DISEASE*

Cousins, C. C., Alosco, M. L., Cousins, H. C., Chua, A., Steinberg, E. G., Chapman, K. R., Bing-Canar, H., Tripodis, Y., Knepper, P. A., Stern, R. A., Pasquale, L. R.

2018; 66 (2): 601-11

● **Roles for Wnt signaling in synapse organization revealed by CRISPR/Cas9-mediated mutagenesis in the mouse retina.**

Sarin, S., Zuniga-Sanchez, E., Patel, M. B., Zhang, K., Cousins, H., Sanes, J. R., Zipursky, S.

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