Stanford

Felix Horns

Assistant Professor of Genetics

Bio

BIO

Felix Horns is an Assistant Professor of Genetics at Stanford University and a Core Investigator at Arc Institute. The Horns group works at the interface of synthetic biology and genomics to develop and apply technologies for monitoring and manipulating cells, with particular focus on the immune system and the brain.

Felix earned his B.A. in Biology from Amherst College and his Ph.D. in Biophysics working with Dr. Stephen Quake at Stanford, where he developed and used single-cell genomics, high-throughput sequencing, and computational analysis approaches to understand the origins of human antibody diversity and to discover principles of how brain circuits assemble during development. He then joined Dr. Michael Elowitz's lab at the California Institute of Technology where he combined synthetic biology and genomics approaches to develop RNA packaging, secretion, and delivery systems, which open new avenues for understanding and controlling cellular behaviors.

ACADEMIC APPOINTMENTS

- Assistant Professor, Genetics
- Member, Bio-X

ADMINISTRATIVE APPOINTMENTS

- Assistant Professor, Genetics, (2024- present)
- Core Investigator, Arc Institute, (2024- present)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Biophysics (2019)
- M.Phil., University of Cambridge , Computational Biology (2013)
- B.A., Amherst College , Biology (2011)

Teaching

COURSES

2025-26

- Advanced Genetics: GENE 205 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Brandon Ameglio, Goldie Roth

Doctoral Dissertation Advisor (AC)

Elizabeth Brown

Publications

PUBLICATIONS

- **Engineered cells as programmable mRNA delivery vehicles Comment** *NATURE REVIEWS BIOENGINEERING*
  Horns, F., Tobin, V., Elowitz, M. B.
  2026
- **Regenerative base editing enables deep lineage recording.** *bioRxiv : the preprint server for biology*
  Chadly, D., Hadas, R., Klock, L., Yue, J., Horns, F., Askary, A., Granados, A., Bouckaert, R., Lois, C., Cai, L., Elowitz, M. B.
  2026
- **Germline-encoded amino acid-binding motifs drive immunodominant public antibody responses.** *Science (New York, N.Y.)*
  Shrock, E. L., Timms, R. T., Kula, T., Mena, E. L., West, A. P., Guo, R., Lee, I., Cohen, A. A., McKay, L. G., Bi, C., Leng, Y., Fujimura, E., Horns, et al
  2023; 380 (6640): eadc9498
- **Lineage tracing reveals fate bias and transcriptional memory in human B cells.** *Life science alliance*
  Swift, M., Horns, F., Quake, S. R.
  2023; 6 (3)
- **Fly Cell Atlas: A single-nucleus transcriptomic atlas of the adult fruit fly.** *Science (New York, N.Y.)*
  Li, H., Janssens, J., De Waegeneer, M., Kolluru, S. S., Davie, K., Gardeux, V., Saelens, W., David, F. P., Brbic, M., Spanier, K., Leskovec, J., McLaughlin, C. N., Xie, et al
  2022; 375 (6584): eabk2432
- **Temporal evolution of single-cell transcriptomes of Drosophila olfactory projection neurons.** *eLife*
  Xie, Q., Brbic, M., Horns, F., Kolluru, S. S., Jones, R. C., Li, J., Reddy, A. R., Xie, A., Kohani, S., Li, Z., McLaughlin, C. N., Li, T., Xu, et al
  2021; 10
- **Single-cell transcriptomes of developing and adult olfactory receptor neurons in Drosophila.** *eLife*
  McLaughlin, C. N., Brbić, M. n., Xie, Q. n., Li, T. n., Horns, F. n., Kolluru, S. S., Kebschull, J. M., Vacek, D. n., Xie, A. n., Li, J. n., Jones, R. C., Leskovec, J. n., Quake, et al
  2021; 10
- **Memory B Cell Activation, Broad Anti-influenza Antibodies, and Bystander Activation Revealed by Single-Cell Transcriptomics.** *Cell reports*
  Horns, F., Dekker, C. L., Quake, S. R.
  2020; 30 (3): 905
- **Single-Cell Transcriptomes Reveal Diverse Regulatory Strategies for Olfactory Receptor Expression and Axon Targeting.** *Current biology : CB*
  Li, H. n., Li, T. n., Horns, F. n., Li, J. n., Xie, Q. n., Xu, C. n., Wu, B. n., Kebschull, J. M., McLaughlin, C. N., Kolluru, S. S., Jones, R. C., Vacek, D. n., Xie, et al
  2020
- **Cloning antibodies from single cells in pooled sequence libraries by selective PCR.** *PloS one*
  Horns, F., Quake, S. R.
  2020; 15 (8): e0236477
- **Signatures of selection in the human antibody repertoire: Selective sweeps, competing subclones, and neutral drift** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Horns, F., Vollmers, C., Dekker, C. L., Quake, S. R.

2019; 116 (4): 1261–66

- **Signatures of selection in the human antibody repertoire: Selective sweeps, competing subclones, and neutral drift.** *Proceedings of the National Academy of Sciences of the United States of America*
  Horns, F., Vollmers, C., Dekker, C. L., Quake, S. R.
  2019
- **Massive Expansion of Gypsy-Like Retrotransposons in Microbotryum Fungi** *GENOME BIOLOGY AND EVOLUTION*
  Horns, F., Petit, E., Hood, M. E.
  2017; 9 (2): 363-371
- **Classifying Drosophila Olfactory Projection Neuron Subtypes by Single-Cell RNA Sequencing.** *Cell*
  Li, H. n., Horns, F. n., Wu, B. n., Xie, Q. n., Li, J. n., Li, T. n., Luginbuhl, D. J., Quake, S. R., Luo, L. n.
  2017; 171 (5): 1206–20.e22
- **Lineage tracing of human B cells reveals the in vivo landscape of human antibody class switching** *ELIFE*
  Horns, F., Vollmers, C., Croote, D., Mackey, S. F., Swan, G. E., Dekker, C. L., Davis, M. M., Quake, S. R.
  2016; 5
- **Lineage tracing of human B cells reveals the in vivo landscape of human antibody class switching.** *eLife*
  Horns, F., Vollmers, C., Croote, D., Mackey, S. F., Swan, G. E., Dekker, C. L., Davis, M. M., Quake, S. R.
  2016; 5