Stanford

Stephen Chang, MD, PhD

- Instructor, Biochemistry
- Instructor, Medicine - Cardiovascular Medicine

CLINICAL OFFICE (PRIMARY)

- **Stanford Cardiovascular Clinic**

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Bio

BIO

Prior to a career in medicine, Dr. Chang was an English major and subsequent novelist at night. During the days, he taught literature part-time at Rutgers University, and for extra money, worked in a laboratory in NYC washing test tubes. Inspired by his laboratory mentor, he began volunteering at the hospital next door, and developed a love for interacting with patients. Through this experience, he saw how caring for others could form deep bonds between people - even strangers - and connect us in a way that brings grandeur to ordinary life.

In addition to seeing patients, Dr. Chang is a physician-scientist devoted to advancing the field of cardiovascular medicine. His research has been focused on identifying a new genetic organism that better models human heart disease than the mouse. For this purpose, he has been studying the mouse lemur, the smallest non-human primate, performing cardiovascular phenotyping (vital signs, ECG, echocardiogram) on lemurs both in-bred (in France) and in the wild (in Madagascar) to try to identify mutant cardiac traits that may be heritable - and in the process, characterize the first high-throughput primate model of human cardiac disease.

CLINICAL FOCUS

- Preventive Cardiology
- Internal Medicine
- Cardiovascular Disease

ACADEMIC APPOINTMENTS

- Instructor, Biochemistry
- Instructor, Medicine - Cardiovascular Medicine
- Member, Cardiovascular Institute

HONORS AND AWARDS

- Advanced Residency Training at Stanford (ARTS) Program, Stanford University School of Medicine (2016-2020)

- ASCI-AAP Travel Grant Award, American Society for Clinical Investigation, Association of American Physicians (2011)
- Member, Gold Humanism Honor Society (2008 - current)
- HHMI Medical Research Fellowship, Howard Hughes Medical Institute, National Institutes of Health (2006-2007)
- NHLBI/NIH Summer Research Fellowship, National Institutes of Health (2005)

PROFESSIONAL EDUCATION

- PhD, Stanford University School of Medicine , Biochemistry (2020)
- Board Certification: Cardiovascular Disease, American Board of Internal Medicine (2019)
- Board Certification: Internal Medicine, American Board of Internal Medicine (2018)
- Residency: University of Minnesota Internal Medicine Residency (2014) MN
- Fellowship: Stanford University Cardiovascular Medicine Fellowship (2017) CA
- Medical Education: University of Cincinnati College of Medicine Registrar (2009) OH

Publications

PUBLICATIONS

- **A molecular cell atlas of mouse lemur, an emerging model primate.** *Nature*
  Ezran, C., Liu, S., Chang, S., Ming, J., Botvinnik, O., Penland, L., Tarashansky, A., de Morree, A., Travaglini, K. J., Zhao, J., Wang, G., Hasegawa, K., Sin, et al
  2025
- **Mouse lemur cell atlas informs primate genes, physiology and disease.** *Nature*
  Ezran, C., Liu, S., Chang, S., Ming, J., Guethlein, L. A., Wang, M. F., Dehghannasiri, R., Olivieri, J., Frank, H. K., Tarashansky, A., Koh, W., Jing, Q., Botvinnik, et al
  2025
- **Tabula Sapiens reveals transcription factor expression, senescence effects, and sex-specific features in cell types from 28 human organs and tissues.** *bioRxiv : the preprint server for biology*
  Quake, S. R.
  2025
- **Beyond the Mouse: The Mouse Lemur as a New Primate Model for Cardiovascular Research.** *Current cardiology reports*
  Chang, S.
  2025; 27 (1): 123
- **Independent expansion, selection and hypervariability of the TBC1D3 gene family in humans.** *Genome research*
  Guitart, X., Porubsky, D., Yoo, D., Dougherty, M. L., Dishuck, P., Munson, K. M., Lewis, A. P., Hoekzema, K., Knuth, J., Chang, S., Pastinen, T., Eichler, E. E.
  2024
- **An organism-wide atlas of hormonal signaling based on the mouse lemur single-cell transcriptome.** *Nature communications*
  Liu, S., Ezran, C., Wang, M. F., Li, Z., Awayan, K., Long, J. Z., De Vlaminck, I., Wang, S., Epelbaum, J., Kuo, C. S., Terrien, J., Krasnow, M. A., Ferrell, et al
  2024; 15 (1): 2188
- **FIRM: Flexible integration of single-cell RNA-sequencing data for large-scale multi-tissue cell atlas datasets.** *Briefings in bioinformatics*
  Ming, J., Lin, Z., Zhao, J., Wan, X., Yang, C., Wu, A. R.
  2022
- **The Tabula Sapiens: A multiple-organ, single-cell transcriptomic atlas of humans.** *Science (New York, N.Y.)*
  Jones, R. C., Karkanias, J., Krasnow, M. A., Pisco, A. O., Quake, S. R., Salzman, J., Yosef, N., Bulthaup, B., Brown, P., Harper, W., Hemenez, M., Ponnusamy, R., Salehi, et al
  2022; 376 (6594): eabl4896

- **Adversarial domain translation networks for integrating large-scale atlas-level single-cell datasets.** *Nature computational science*
  Zhao, J., Wang, G., Ming, J., Lin, Z., Wang, Y., Wu, A. R., Yang, C.
  2022; 2 (5): 317-330

- **Publisher Correction: Cell types of origin of the cell-free transcriptome.** *Nature biotechnology*
  Vorperian, S. K., Moufarrej, M. N., Tabula Sapiens Consortium, Quake, S. R., Jones, R. C., Karkanias, J., Krasnow, M., Pisco, A. O., Quake, S. R., Salzman, J., Yosef, N., Bulthaup, B., Brown, P., et al
  2022

- **Cell types of origin of the cell-free transcriptome.** *Nature biotechnology*
  Vorperian, S. K., Moufarrej, M. N., Tabula Sapiens Consortium, Quake, S. R., Jones, R. C., Karkanias, J., Krasnow, M., Pisco, A. O., Quake, S. R., Salzman, J., Yosef, N., Bulthaup, B., Brown, P., et al
  2022

- **RNA splicing programs define tissue compartments and cell types at single cell resolution.** *eLife*
  Olivieri, J. E., Dehghannasiri, R., Wang, P. L., Jang, S., de Morree, A., Tan, S. Y., Ming, J., Ruohao Wu, A., Tabula Sapiens Consortium, Quake, S. R., Krasnow, M. A., Salzman, J.
  2021; 10

- **A molecular cell atlas of the human lung from single-cell RNA sequencing.** *Nature*
  Travaglini, K. J., Nabhan, A. N., Penland, L., Sinha, R., Gillich, A., Sit, R. V., Chang, S., Conley, S. D., Mori, Y., Seita, J., Berry, G. J., Shrager, J. B., Metzger, et al
  2020

- **Molecular profiling of dilated cardiomyopathy that progresses to heart failure.** *JCI insight*
  Burke, M. A., Chang, S., Wakimoto, H., Gorham, J. M., Conner, D. A., Christodoulou, D. C., Parfenov, M. G., Depalma, S. R., Eminaga, S., Konno, T., Seidman, J. G., Seidman, C. E.
  2016; 1 (6)

- **5 ' RNA-Seq identifies Fhl1 as a genetic modifier in cardiomyopathy** *JOURNAL OF CLINICAL INVESTIGATION*
  Christodoulou, D. C., Wakimoto, H., Onoue, K., Eminaga, S., Gorham, J. M., Depalma, S. R., Herman, D. S., Teekakirikul, P., Conner, D. A., McKean, D. M., Domenighetti, A. A., Aboukhalil, A., Chang, et al
  2014; 124 (3): 1364-1370

- **Connexin43 Modulates Cell Polarity and Directional Cell Migration by Regulating Microtubule Dynamics** *PLOS ONE*
  Francis, R., Xu, X., Park, H., Wei, C., Chang, S., Chatterjee, B., Lo, C.
  2011; 6 (10)

- **Genetics of hypertrophic cardiomyopathy** *CURRENT OPINION IN CARDIOLOGY*
  Konno, T., Chang, S., Seidman, J. G., Seidman, C. E.
  2010; 25 (3): 205-209