Stanford

Lauren Goins

Assistant Professor of Developmental Biology

Bio

BIO

Dr. Lauren Goins is an Assistant Professor at Stanford University School of Medicine in the Developmental Biology Department. The Goins lab aims to understand how cells make decisions. Work from the lab tackles the major unsolved issue in hematopoietic development: how extracellular cues coordinate with the intracellular cell division machinery to influence cell fate decisions and ultimately produce the vast repertoire of blood cell types in the correct proportions.

Lauren grew up in New Orleans, LA where she pursued her three major passions: cooking, math, and science. Dr. Goins continues to pursue these passions with the way she approaches research using biochemistry, quantitative methods, and light microscopy to visualize and genetically dissect fundamental biological phenomena. During her formative years, Lauren participated in science and engineering summer programs at the Colorado School of Mines, Xavier University, MIT, Stanford, Università di Siena, University College Dublin, and Harvard.

Lauren received her Bachelor's degree in Biochemical Sciences from Harvard College in Cambridge, MA. While at Harvard, Lauren worked at the Dana Farber Cancer Institute at Harvard Medical School helping to develop and evaluate candidate HIV/AIDS vaccines in non-human primate models. Lauren then completed her doctoral training in Molecular Biology and Biochemistry at UCSF where she studied how the actin cytoskeleton influences cell motility, cell shape, and cell cycle progression. During her graduate work, Lauren used high-resolution live imaging, in vitro reconstitution assays, and flow cytometry to study the unique properties of tropomyosin isoforms. Dr. Goins then did her postdoctoral research at UCLA where she utilized Drosophila as a model system to genetically dissect molecular and cellular mechanisms of hematopoiesis. As a postdoctoral scholar, she developed a live imaging method to visualize the blood system in a living intact animal and quantitative methods to analyze images from their research.

Lauren joined Stanford as an Assistant Professor in 2023. The Goins lab uses Drosophila melanogaster as a model system and integrates their findings with research from mammalian hematopoiesis studies. This work will help build models of how individual blood cells integrate multiple cell-intrinsic and extrinsic inputs to produce distinct cell fate outputs, and how these are modified during stress or immune challenge. Ultimately, the answers to these profound fundamental questions will help us and the broader hematopoietic field develop therapies to treat debilitating diseases in which the processes of self-renewal and differentiation go awry, such as Acute Myeloid Leukemia

ACADEMIC APPOINTMENTS

- Assistant Professor, Developmental Biology
- Member, Bio-X
- Faculty Fellow, Sarafan ChEM-H

HONORS AND AWARDS

- Baxter Faculty Scholar Award, Donald E. and Delia B. Baxter Foundation (2023)
- Catalyst Award, Koret Foundation (2023)
- Gabilan Faculty Fellow, Stanford University (2023)
- K01 Career Development Award, National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (2022)
- Boyer/Parvin Postdoctoral Award, UCLA Molecular Biology Institute (2021)
- Discovery Sciences Emerging Scholars, Vanderbilt University (2021)
- Postdoctoral Fellowship, Intersections Science Fellows Symposium (ISFS) (2021)
- Extra Innings Graduate Fellowship, Jackie Robinson Foundation (2010-2012)
- Ford Foundation Predoctoral Fellowship, National Academy of Sciences (2008-2011)
- Graduate Fellowship, UNCF/Gates Millennium Scholars (2006)
- Graduate Research Fellowship, National Science Foundation (2005-2008)
- Scholarship, UNCF/Gates Millennium Scholars (2000-2004)
- Scholarship, Jackie Robinson Foundation (2000-2004)
- Scholarship, Ron Brown Scholars Program (2000-2004)
- Black History Makers of Tomorrow Contest Winner, McDonald's (2000)
- Louisiana Young Heroes Award, Louisiana Public Broadcasting (2000)
- Scholarship, American Chemical Society (2000)
- Scholarship, National Merit Scholarship Program (2000)
- United States Presidential Scholar, President Bill Clinton (2000)

LINKS

- The Goins Lab: https://goinslab2023.sites.stanford.edu

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Goins lab aims to understand how cells make decisions. Our research focuses on how young, immature blood stem cells, with the potential to become many different cell types, choose between these cell fates. During blood cell development, and in response to stress, blood stem cells must make a choice between “proliferation” to expand their population by making additional copies of themselves, and “differentiation” to produce mature functional blood cell types. A fully functioning immune system requires a balance between these processes to maintain a pool of stem cells while producing functional blood cells to help mitigate stresses such as injury or infection. When these processes go awry or become unbalanced, blood cancers such as Acute Myeloid Leukemia may occur. Our research elucidates how blood stem cells make these fate decisions by studying the fundamental molecular and cellular mechanisms that control the decision-making process.

Teaching

STANFORD ADVISEES

Doctoral Dissertation Advisor (AC)

Gerson Ascencio

Publications

PUBLICATIONS

- **Wnt signaling couples G2 phase control with differentiation during hematopoiesis**
  Goins, L. M., Girard, J. R., Mondal, B., Buran, S., Su, C. C., Tang, R., Biswas, T., Banerjee, U.
  BioRxiv.
  2023

- **Intermediate progenitor cells provide a transition between hematopoietic progenitors and their differentiated descendants** *DEVELOPMENT*
  Spratford, C. M., Goins, L. M., Chi, F., Girard, J. R., Macias, S. N., Ho, V. W., Banerjee, U.
  2021; 148 (24)

- **Paths and pathways that generate cell-type heterogeneity and developmental progression in hematopoiesis** *ELIFE*
  Girard, J. R., Goins, L. M., Vuu, D. M., Sharpley, M. S., Spratford, C. M., Mantri, S. R., Banerjee, U.
  2021; 10

- **Drosophila as a Genetic Model for Hematopoiesis** *GENETICS*
  Banerjee, U., Girard, J. R., Goins, L. M., Spratford, C. M.
  2019; 211 (2): 367-417

- **A novel tropomyosin isoform functions at the mitotic spindle and Golgi in Drosophila** *MOLECULAR BIOLOGY OF THE CELL*
  Goins, L. M., Mullins, R.
  2015; 26 (13): 2491-2504

- **Arp2/3 Complex and Cofilin Modulate Binding of Tropomyosin to Branched Actin Networks** *CURRENT BIOLOGY*
  Hsiao, J. Y., Goins, L. M., Petek, N. A., Mullins, R.
  2015; 25 (12): 1573-1582

- **Comparative analysis of tools for live cell imaging of actin network architecture.** *Bioarchitecture*
  Belin, B. J., Goins, L. M., Mullins, R. D.
  2014; 4 (6): 189-202

- **Prior exposure to an attenuated Listeria vaccine does not reduce immunogenicity: pre-clinical assessment of the efficacy of a Listeria vaccine in the induction of immune responses against HIV.** *Journal of immune based therapies and vaccines*
  Whitney, J. B., Mirshahidi, S., Lim, S. Y., Goins, L., Ibegbu, C. C., Anderson, D. C., Raybourne, R. B., Frankel, F. R., Lieberman, J., Ruprecht, R. M.
  2011; 9: 2

- **Molecularly cloned SHIV-1157ipd3N4: a highly replication-competent, mucosally transmissible R5 simian-human immunodeficiency virus encoding HIV clade C env** *JOURNAL OF VIROLOGY*
  Song, R. J., Chenine, A., Rasmussen, R. A., Ruprecht, C. R., Mirshahidi, S., Grisson, R. D., Xu, W., Whitney, J. B., Goins, L. M., Ong, H., Li, P., Shai-Kobiler, E., Wang, et al
  2006; 80 (17): 8729-8738

- **Effects of temperature and membrane fluidity on motile keratocytes: A quantitative analysis of speed and morphology**
  Wilson, C. A., Ream, R. A., Goins, L. M., Theriot, J. A.
  BIOPHYSICAL SOCIETY.2004: 569A

- **The role of membrane fluidity in the motility of fish keratocytes**
  Ream, R. A., Goins, L., Theriot, J. A.
  AMER SOC CELL BIOLOGY.2001: 170A