

LAUREN M. GOINS

Postdoctoral Fellow
The Banerjee Lab
Department of Molecular, Cell, and Developmental Biology
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EDUCATION

- PhD University of California, San Francisco** September 2013
Biochemistry and Molecular Biology
Dissertation: The roles of non-muscle tropomyosin isoforms in cytoskeleton function in *Drosophila melanogaster*
Committee: R. Dyche Mullins (chair), Ron Vale, Orion Weiner
- A.B. Harvard College** June 2004
Biochemical Sciences, High Honors

RESEARCH EXPERIENCE

- University of California, Los Angeles** Los Angeles, CA
Postdoctoral Fellow; Advisor: Utpal Banerjee, PhD 2014-present
Cellular mechanisms that control progenitor maintenance and differentiation during hematopoiesis
- Developed a live imaging method to visualize the hematopoietic system in intact *Drosophila* larvae
 - Identified Wnt6 as the master regulator of a novel network of signaling pathways that play critical roles in maintaining blood progenitors in a semi-quiescent state through control of cell cycle progression, cell size, and differentiation
 - Characterized new subpopulations of hematopoietic progenitors and differentiated cells by combining bulk and single cell transcriptomics, metabolic pathway analysis, and genetic dissection
 - Demonstrated that intermediate progenitors are a unique cell type, which lies at the spatial and developmental boundary between immature and mature blood cells and acts as a platform for exerting lineage choice mechanisms
- University of California, San Francisco** San Francisco, CA
Graduate Researcher; Advisor: R. Dyche Mullins, PhD 2005-2014
Regulation of cytoskeletal dynamics by non-muscle tropomyosin isoforms
- Discovered that non-muscle *Drosophila* cells express three isoforms of the actin-binding protein tropomyosin, each of which binds to a functionally distinct actin network in the cell and displays unique biological characteristics with roles in cell cycle, cell shape, and genomic stability
 - Developed the first tractable system for studying the mechanisms by which different isoforms of tropomyosin bind to distinct cellular structures, which led directly to mechanistic insights into how branched lamellipodial actin networks are insulated from the effects of tropomyosin
 - Completed the first comprehensive comparison of tools for visualizing filamentous actin in live cells, which revealed that different actin probes are sensitive to different populations of filaments and enabled the first studies of biochemically distinct actin networks in living cells

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Marine Biological Laboratory

Participant, MBL Physiology Course

Woods Hole, MA

Summer 2007

- Studied the biophysics of membrane bleb formation with Rob Phillips, PhD, Caltech
- Investigated force generation and focal adhesion maturation during cell motility with Clare Waterman, PhD, NIH, and Margaret Gardel, PhD, U. Chicago
- Analyzed mechanisms of end-tracking by microtubule-associated proteins with Marileen Dogterom, PhD, EMBL

Harvard Medical School, Dana-Farber Cancer Institute

Research Assistant and Undergraduate Researcher; Advisor: Ruth Ruprecht, MD, PhD

Boston, MA

2002-2005

HIV/AIDS vaccine development

- Determined that addition of NF- κ B binding sites to the HIV long terminal repeat (LTR), a promoter-like region that controls viral gene expression, increases replicative capacity of the virus
- Contributed to the evaluation of recombinant *Listeria* vectors as candidate oral AIDS vaccines by cloning potential vectors, preparing viral RNA, testing mammalian cell lines, and isolating PBMCs from rhesus macaque blood samples taken pre- and post-immunization or virus challenge

University College Dublin, National Virus Reference Laboratory of Ireland

Visiting Researcher; Advisor: William Hall, MD, PhD

Dublin, Ireland

Summer 2004

- Sequenced and genotyped HIV-1 from patient samples to determine the prevalence and spread of non-B subtypes in the population

Stanford University

Undergraduate Researcher; Advisor: Julie Theriot, PhD

Los Angeles, CA

Summer 2001

Stanford Summer Research Program in the Biomedical Sciences (SSRPBS)

- Investigated how membrane fluidity affects actin-based cell motility using live imaging of fish keratocytes and mathematical modeling

TEACHING AND MENTORING EXPERIENCE

University of California, San Francisco

Teaching Assistant, Biological Regulatory Mechanisms, Tetrad Graduate Program

San Francisco, CA

Winter 2007

- Facilitated weekly review sessions, created student handouts and review materials, and graded problem sets and exams with a team of 4 teaching assistants for a first-year graduate course focused on the fundamental principles of molecular biology

Students Mentored at UCLA:

Shreya Mantri, UCLA Undergraduate, Biomedical Research Minor Thesis: Characterizing the stages of differentiation of progenitor cells in the *Drosophila melanogaster* lymph gland, 2018-2020. Currently a PhD Student in Biological and Biomedical Sciences at Harvard Medical School.

Chloe Su, UCLA Undergraduate, Biomedical Research Minor Thesis: A two-step approach to investigating hematopoiesis in the *Drosophila* lymph gland: Characterization of zone markers and manipulation of the Wnt/Wg signaling pathway, 2015-2017. Currently a Masters Student in Epidemiology at Stanford.

Titash Biswas, Crescenta Valley High School, Project: The role of Wnt6 in progenitor maintenance during hematopoiesis in *Drosophila melanogaster*, Summer 2017. Currently an Undergraduate at MIT.

Rose Monahan, University of Virginia School of Medicine, Project: Cell cycle and Wg expression in AML1-ETO mutant hemocytes, Summer 2015. Currently a Resident in Internal Medicine at USC.

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Students Mentored at UCSF:

Jennifer Hsiao, UCSF PhD Student, Graduate Thesis: Fun at the leading edge: Biochemical and biomechanical studies of the actin networks that drive cell motility, 2010-2015. Currently a Scientist at Denali Therapeutics.

Johnny Rodriguez, UCSF PhD Student, Project: *In vitro* reconstitution of tropomyosin isoform binding to native actin filament networks, 2014. Currently a PhD Student at UCSF.

Fitzherbert Harry, University of the Virgin Islands Undergraduate Student, Project: Biochemical characterization of cytoskeletal tropomyosin, Summer 2008. Received a Doctorate in Physical Therapy from Hampton University. Currently a certified therapist and small business owner.

GRANTS AND AWARDS

RO1 Supplement to Promote Diversity in Health-Related Research	2018-2019
National Heart, Lung, and Blood Institute, National Institutes of Health	
Ruth L. Kirschstein Postdoctoral Fellowship	2015-2018
National Research Service Award (NRSA) T32 Tumor Cell Biology Training Program	
UCLA MCDB Annual Retreat Best Poster Award, Postdoctoral Scholar	2015; 2017
National Academy of Sciences (NAS) Ford Foundation Pre-Doctoral Fellowship	2008-2011
National Science Foundation (NSF) Pre-Doctoral Graduate Research Fellowship	2005-2008
UNCF/Gates Millennium Scholars Award	2006; 2000-2004
Graduate Fellowship; Undergraduate Scholarship	
Jackie Robinson Foundation (JRF) Award	2010-2012; 2000-2004
Extra Innings Graduate Fellowship; Undergraduate Scholarship	
Ron Brown Scholars Program Undergraduate Scholarship	2000-2004
American Chemical Society Undergraduate Scholarship	2000
Louisiana Young Heroes Award	2000
United States Presidential Scholar (awarded by President Bill Clinton)	2000
McDonald's Black History Makers of Tomorrow Contest Winner	2000

DIVERSITY-RELATED ACTIVITIES AND PUBLIC SERVICE

Member	UCLA Life Sciences Anti-Racism Taskforce	2020
Member	Bay Area Women's and Children's Center (BAWCC) Women's Leadership Council	2011-2014
Invited Speaker	NextGene Girls Summer of Science Program through the Boys and Girls Clubs of San Francisco	2013
Participant	The Compact for Faculty Diversity 19 th Annual National Institute on Teaching and Mentoring	2012
Invited Speaker	JRF National Mentoring and Leadership Conference	2012
Member	Search Committee for Dean of the UCSF Graduate Division	2011
Member	Search Committee for UCSF Multicultural Resource Center Director	2011
Volunteer	Bay Area Science Festival	2011
Member	UCSF Chancellor's Council on Campus Climate, Culture and Inclusion	2010-2012
Member	Planning Committee for the National Conference of Ford Foundation Fellows, The National Academies of Sciences	2010

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DIVERSITY-RELATED ACTIVITIES AND PUBLIC SERVICE (CONT.)

Member	Search Committee for Vice Chancellor of Diversity at UCSF	2010
Board President	UCSF Minority Graduate Student Organization	2009-2011
Member	UCSF Chancellor's Advisory Subcommittee on Diversity and Outreach	2009-2010
Member	UCSF Faculty-Student Diversity Committee	2007-2009
Student Recruiter	Annual Biomedical Research Conference for Minority Students	2007
Volunteer	High School Outreach Conference at UCSF	2007
Member	UCSF Minority Graduate Student Organization	2005-2012
Volunteer	UCSF Science and Health Partnership Scientist-Teacher Action Teams	2005-2006
Mentor	Saturday Science Academy at Harvard University	2000-2001

PUBLICATIONS

Journal Publications:

Banerjee, U.B.*†, Girard J.R.*†, **Goins, L.M.*†**, and Spratford, C.M.*† (2019). *Drosophila as a Genetic Model for Hematopoiesis*. *Genetics* 211, 367-417. doi.org/10.1534/genetics.118.300223

*equal contribution †corresponding author

Goins, L.M., and Mullins, R.D. (2015). *A novel tropomyosin isoform functions at the mitotic spindle and Golgi in Drosophila*. *Mol Biol Cell* 26, 2491–2504. doi.org/10.1091/mbc.E14-12-1619

Hsiao, J.Y., **Goins, L.M.**, Petek, N.A., and Mullins, R.D. (2015). *Arp2/3 complex and cofilin modulate binding of tropomyosin to branched actin networks*. *Curr Biol* 25, 1573–1582. doi.org/10.1016/j.cub.2015.04.038

Belin, B.J.*, **Goins, L.M.***, and Mullins, R.D. (2014). *Comparative analysis of tools for live cell imaging of actin network architecture*. *BioArchitecture* 4, 189–202. doi.org/10.1080/19490992.2014.1047714
*equal contribution

Whitney, J.B., Mirshahidi, S., Lim, S.-Y., **Goins, L.**, Ibegbu, C.C., Anderson, D.C., Raybourne, R.B., Frankel, F.R., Lieberman, J., and Ruprecht, R.M. (2011). *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*. *J Immune Based Ther Vaccines* 9, 2. doi.org/10.1186/1476-8518-9-2

Song, R.J., Chenine, A.-L., Rasmussen, R.A., Ruprecht, C.R., Mirshahidi, S., Grisson, R.D., Xu, W., Whitney, J.B., **Goins, L.M.**, Ong, H., et al. (2006). *Molecularly cloned SHIV-1157ipd3N4: a highly replication-competent, mucosally transmissible R5 simian-human immunodeficiency virus encoding HIV clade C Env*. *J. Virol.* 80, 8729–8738. doi.org/10.1128/JVI.00558-06

Journal Papers in Review or in Preparation:

Goins, L.M., Girard, J.R., Mondal, B.M., Su, C., and Banerjee, U.B. (in preparation). *Wnt6 mediated signaling controls G2 arrest in blood progenitor cells to limit differentiation during hematopoiesis*.

Girard, J.R.*, **Goins, L.M.***, Vuu, D.*, Sharpley, M.S., Spratford, C.M., and Banerjee, U.B. (in preparation). *RNASeq analysis reveals developmental heterogeneity during hematopoiesis*.
*equal contribution

Spratford, C.M., **Goins, L.M.**, Chi, F., Girard, J.R., Macias, S.N., Ho, V.W., and Banerjee, U.B. (submitted). *Intermediate Progenitor cells provide a transition between hematopoietic progenitors and their differentiated descendants*. doi.org/10.1101/2020.10.12.336743

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Conference Presentations and Abstracts:

Goins LM, Mondal BC, Girard JR, and Banerjee UB. *Cell cycle control of blood progenitors regulates their fate and differentiation state*. ASCB/EMBO Annual Meeting, December 2018, San Diego, CA. Stem Cells and Organoids Minisymposium Speaker.

Goins LM, Girard JR, Spratford CM, Mondal BC, and Banerjee UB. *Wnt signaling helps regulate oxidative stress and cell cycle progression in stress-sensitive blood progenitor cells to control their maintenance and differentiation*. Beyond Homeostasis: Stem Cells Under Stress, ASCB Doorstep Meeting, December 2018, San Diego, CA. Invited Speaker and Poster.

Goins LM and Mullins RD. *Drosophila Tropomyosin Isoforms Perform Distinct Functions during Interphase and Mitosis*. 53rd American Society for Cell Biology (ASCB) Annual Meeting, December 2013, New Orleans, LA. Abstract and Poster.

Goins LM and Mullins RD. *Multiple Nonmuscle Tropomyosin Isoforms Perform Overlapping but Distinct Functions in Drosophila*. 51st American Society for Cell Biology (ASCB) Annual Meeting, December 2011, Denver, CO. Abstract and Poster.

Goins LM and Mullins RD. *Multiple Nonmuscle Tropomyosin Isoforms Perform Diverse Functions in Drosophila*. Gordon Research Conference on Contractile and Motile Systems, August 2011, New London, NH. Abstract and Poster.

Goins LM and Mullins RD. *Drosophila melanogaster Cells Express Two Nonmuscle Tropomyosin Isoforms with Different Functions*. 50th American Society for Cell Biology (ASCB) Annual Meeting, December 2010, Philadelphia, PA. Abstract and Poster.

Goins LM, Dawicki McKenna JM, Chen X, Cohen AE, Franck A, Fu C, Kasza K, Vizcarra C, Wunderlich Z, Husson J, Tischer C, Dogterom M. *Mechanisms of End-Tracking by Microtubule-associated Proteins*. 47th American Society for Cell Biology (ASCB) Annual Meeting, December 2007, Washington, D.C. Abstract and Poster.

Goins LM, Coughlan S, Fitzpatrick F, Bergin C, Mulcahy F, Sheehan G, Hall WW. *Genotyping HIV-1 Non-B Subtypes in Ireland: Comparison of env and pol Methods*. 15th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID), April 2005, Copenhagen. Abstract and Poster.

Ream RA, **Goins LM**, Theriot, JA. *The Role of Membrane Fluidity in the Motility of Fish Keratocytes*. 41st American Society for Cell Biology (ASCB) Annual Meeting, December 2001, Washington, D.C. Abstract and Poster.