Mia Tauna Levine, PhD

Department of Biology and Epigenetics Institute

University of Pennsylvania

204B Carolyn Lynch Laboratories

Philadelphia, PA 19104-6081

m.levine@sas.upenn.edu 215-573-9709

**Education**

PhD Molecular Population Genetics, University of California, Davis 2009

MSc Ecology and Evolution, University of Illinois, Champaign 2003

BA Biology *with honors*, University of Pennsylvania, 1999

*magna cum laude*

**Professional Experience**

Assistant Professor of Biology, Univ. of Pennsylvania, Philadelphia, PA 2015-

Core Faculty Member, Penn Epigenetics Institute, Philadelphia, PA 2015-

Postdoctoral Fellow, Fred Hutchinson Cancer Research Center, Seattle, WA 2009-15

Advisor: Harmit Malik (*Evolutionary cell biology)*

*Causes and functional consequences of chromatin protein evolution*

Biocomplexity Outreach Coordinator, Smithsonian, Edgewater, MD 2000-01

*Curriculum development for Belizean teachers* *on mangrove conservation*

Science Education Intern, NSF ACCESS Science, Univ. of Pennsylvania 2000

*Curriculum development, science teaching at Lee Elementary School*

**Awards and Fellowships**

SMBE Allan Wilson Junior Award for Independent Research 2017

Forbeck Scholar Award, **William Guy Forbeck Research Foundation** 2016-20

NIH K99 Pathway to Independence Award 2013-15

NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship 2011-13

Genetics Society of America DeLill Nasser Award 2010

Dissertation Year Fellowship, University of California, Davis 2008-09

ARCS (Achievement Awards for College Students) Fellowship 2005

NSF Pre-doctoral Graduate Research Fellowship 2003-06

**Research Grants**

NIH NIGMS R35 MIRA (GM124684-01) 2017-22

NIH NIGMS R00 (K99/R00GM107351) 2015-17

NSF Doctoral Dissertation Improvement Grant 2008-09

Center for Population Biology Research Support Grant 2005-07

UC Davis Humanities Research Grant 2004-05

**Selected Publications**

**(**all publications peer-reviewed except when indicated by a “#”**)**

Lee, Y.C.G., Leek, C., and **M. T. Levine (**2017)Recurrent innovation at genes required for telomere integrity in Drosophila. *Molecular Biology and Evolution*. 34: 467-482.

**Levine, M.T**., Vander Wende, H., Hseih, E., Baker E., and H.S. Malik (2016) Recurrent gene duplication diversifies genome defense repertoire in Drosophila. *Molecular Biology and Evolution.* 33:1641-53.

**Levine, M.T.,** Vander Wende, H., and H.S. Malik (2015) Mitotic fidelity requires transgenerational action of a testis-restricted HP1. *eLife* **4**: e07378.

***Additional coverage:***

“Biparental control in remodeling sperm” *Science* 7 August 2015: Vol. 349

no. 6248 p. 599

“Transgenerational remodelling of sperm DNA” *Nature Reviews Molecular Cell Biology* 23 July 2015 Vol. 16, no. 453

“Reprogramming sperm DNA” (Interview) The Naked Scientist eLife podcast,

27 July 2015

**Levine, M.T.** and H.S. Malik (2013) A rapidly evolving genomic toolkit of Drosophila heterochromatin. *Fly* **7:** 137-141.

**Levine, M.T.,**McCoy, C. Vermaak. D., LeeY.C.G, Hiatt, M.A., Matsen, F.A., and H.S. Malik (2012) Phylogenomic analysis reveals dynamic evolutionary history of the Drosophila Heterochromatin Protein 1 (HP1) gene family.  *PLoS Genetics* **8**(6): e1002729.

Moyle, L.C., **Levine, M.T.,**Stanton, M.L. and J.W. Wright (2012) Hybrid sterility over tens of meters between ecotypes adapted to serpentine and non-serpentine soils. *Evolutionary Biology* **39:** 207-218.

**#Levine, M.T.**and H.S. Malik (2011) Learning to protect your genome on the fly. *Cell* **147:**1440-1441.

* Preview for: Khurana, J.S. *et al*. (2011) Adaptation to transposon invasion in Drosophila melanogaster. *Cell* **147:**1551-1563.

**Levine, M.T.,** Eckert, M., and D.J. Begun (2011) Whole genome expression plasticity across tropical and temperate *Drosophila melanogaster* populations from eastern Australia. *Molecular Biology and Evolution* **28:** 249–256.

Levine, M.T. and D.J. Begun (2008) Evidence of spatially varying selection at four chromatin-remodeling loci in *Drosophila melanogaster*. *Genetics* 179: 455-473.

Turner, L.T., Levine, M.T., and D.J.Begun (2008) Genomic analysis of adaptive differentiation in *Drosophila melanogaster*. *Genetics* 179: 475-485.

Levine, M.T., Holloway, A.K., Arshad, U., and D.J. Begun (2007) Pervasive and largely lineage-specific adaptive protein evolution in the dosage compensation complex of *Drosophila melanogaster*. *Genetics* 177: 1959–1962.

**Levine, M.T.** and D.J. Begun (2007) Comparative population genetics of the immunity gene, relish: Is adaptive evolution iiosyncratic? *PLoS ONE* **2**(5): e442.

**Levine, M.T.,** C. D. Jones, A. D. Kern, H. A. Lindfors, and D. J. Begun (2006) Novel genes derived from noncoding DNA in *Drosophila melanogaster* are frequently X-linked and exhibit testis-biased expression. *Proceedings of the National Academy of Sciences* *USA* **103:** 9935-9939.

**Invited Talks**

Bryn Mawr College, Department of Biology 2016

*Causes and functional consequences of DNA packaging evolution*

William Guy Forbeck Foundation Annual Forum on Aneuploidy and

Genome Instability, Hilton Head, SC 2016

*Evolutionary and functional diversification of paternal DNA packaging*

*proteins in Drosophila*

Villanova University, Department of Biology 2016

*Evolutionary and functional diversification of the Heterochromatin*

*Protein 1 gene family*

PSOM, University of Pennsylvania, Epigenetics of Cell Fate Symposium 2016

*Evolutionary and functional diversification of the Heterochromatin*

*Protein 1 gene family*

New York University, Center for Genomics and Systems Biology 2014

*Revolving door evolution of essential DNA packaging proteins*

University of Pennsylvania, Evolution Cluster 2014

*Revolving door evolution of essential DNA packaging proteins*

Fred Hutchinson Cancer Research Center, Seattle WA 2012

*Functional diversification of the Heterochromatin Protein 1 gene family*

**Conference Platform (\*) and Posters Presentations**

\*Saint-Leandre, B., Lee, Y.C.G, and **M.T. Levine (**2017, upcoming) Genetic conflict shapes Drosophila telomeres. *Society of Molecular Biology and Evolution Meeting.* Austin.

**\***Mauger, M., Helleu, Q., and **M.T. Levine** (2017) Intra-genomic conflict drives Heterochromatin Protein 1 (HP1) gene family diversification. *International Conference on Drosophila Heterochromatin*, Sardinia, Italy.

**\***Helleu, Q. and **M.T. Levine** (2017) HP1 gene family diversification suggests recurrent innovation in paternal chromosome packaging across Diptera evolution. *Genetics Society of America, Drosophila Research Conference*, San Diego.

**Levine, M.T.,** Vander Wende, H., Hsieh, E., and H.S. Malik (2015) Recurrent gene duplication diversifies host repertoire of genome defense. *Genetics Society of America Drosophila Research Conference*, Chicago.

**\*Levine, M.T.,** Vander Wende, H., and H.S. Malik (2014). A new paternal effect lethal is required to prime paternal chromatin for embryonic mitosis. *Genetics Society of America Drosophila Research Conference*, San Diego.

**Levine, M.T.** and H.S. Malik (2013) A phylogenetically plastic heterochromatin protein mediates epigenetic information transfer from sperm to egg. *Society for Molecular Biology and Evolution Meeting*, Chicago.

**\*Levine, M.T.,** McCoy, C., Lee, G., Vermaak, D., Hiatt, M.A., Matsen, F., and H.S. Malik (2012) Phylogenomic analysis of the Heterochromatin Protein 1 gene family defines new germline-restricted functions. *Genetics Society of America Drosophila Research Conference*, Chicago.

**\*Levine, M.T**., McCoy, C., Lee, G., Vermaak, D., Hiatt, M.A., Matsen, F., and H.S. Malik (2011) Phylogenomics of the Heterochromatin Protein 1 gene family guides analysis of germline heterochromatin. *International Conference on Drosophila Heterochromatin*, Gubbio, Italy.

**University Teaching**

Course Instructor, University of Pennsylvania, BIOL 433

*Genetics of Adaptation: How sex, pathogens, and the environment* 2017

*shape modern genomes*

Co-sponsor BIOL 399, Ying Xiong 2016-17

Co-sponsor BIOL 399, 499 Molly Brothers 2016-17

Guest Lecturer, University of Pennsylvania, BIOL 540

*Introduction to Drosophila as a model organism* 2016

Guest Lecturer, University of Washington

*Evolutionary Genetics & Genomics (population genetics section)* 2011

Graduate Teaching Assistantship, University of California, Davis

*Population Genetics* 2007

**Students Mentored at Penn**

**Kevin Yang,** PURM Summer Student (starting May)2017-

**Juan Botero,** PURM Summer Student (starting June)2017-

**Christopher Pai,** BGS rotation student 2017

**MacKenzie Mauger**, undergraduate work-study student 2016-

**Jennifer Aleman**, BGS rotation student 2016

**Academic Service**

**Biology Department**

Dissertation Committee Member, Riley Graham 2017

Biology majors information session speaker 2017

Biology Graduate Group Improvement Committee 2017-

General exam committee member, Tomohiro Kumon 2017

Biology Seminar Series, Committee Chair 2016-

Graduate Group Recruitment Planning Committee Chair 2016-

Biology Graduate Group Recruitment Visit Seminar Speaker 2016

Computational Biology Curriculum Committee 2016-

Biology Retreat Poster Judge 2016

Biology Graduate Group Orientation Seminar Speaker 2016

General exam committee member, Michael Warner 2016

Dissertation Committee Member, Rohini Singh 2016-

Dissertation Committee Member, Alexandra Brown 2016-

Dissertation Committee Member, Un-Sa Lee 2016-

Dissertation Committee Member, Run Jin 2016

Dissertation Committee Member, Michael Warner 2016-

Center for Teaching and Learning, Panel Member 2015

**School of Arts and Sciences**

Velay Fellowship Selection Committee 2016

Judge, “Pop Talks” (Penn Graduate Women in Science and Engineering) 2015

**Community**

Epigenetics and Chromatin Session Chair, Drosophila Research Conference 2017

National Science Foundation Grant Review Panelist, ad hoc Reviewer 2014-

Reviewer— PLoS Genetics, Molecular Ecology, Genetics,

Molecular Biology and Evolution, Heredity, Proc. Roy. Soc

BMC Genomics, Genome Biology and Evolution

**Current External Funding**

**1K99GM107351 NIH/NIGMS Pathway to Independence Award** 09/13-06/18

“Evolutionary and functional diversification of chromatin proteins”

Role: PI ($250,000/year indirect & direct)

**GM124684-01 NIH/NIGMS R35 Maximizing Individual Researchers’** *TBD*

**Award for Early Stage Investigators**

“Causes and functional consequences of chromatin evolution”

Role: PI ($245,000/year, 5 years)

*(awarded 07/01/2017, start date TBD)*

**Current Levine Lab Personnel**

**Courtney Leek, BA,** *Lab Manager/Research Specialist* 09/2015-

**Quentin Helleu, PhD,** *Postdoctoral Scientist* 01/2016-

**Bastien Saint-Leandre,** **PhD**, *Postdoctoral Scientist*  04/2016-

**MacKenzie Mauger,** *Undergraduate Researcher* 05/2016-

**Juan Botero,** *PURM Summer Student* 05/2017-

**Kevin Yang,** *PURM Summer Student* 06/2017-