

## Mia T. Levine, PhD

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### Education

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| PhD | Molecular Population Genetics, University of California, Davis                     | 2009 |
| MSc | Ecology and Evolution, University of Illinois, Champaign                           | 2003 |
| BA  | Biology <i>with honors</i> , University of Pennsylvania,<br><i>magna cum laude</i> | 1999 |

### Professional Experience

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| 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<br>Advisor: Harmit Malik ( <i>Evolutionary cell biology</i> )<br><i>Causes and functional consequences of chromatin protein evolution</i> | 2009-15 |
| Biocomplexity Outreach Coordinator, Smithsonian, Edgewater, MD<br><i>Curriculum development for Belizean teachers on mangrove conservation</i>   | 2000-01 |
| Science Education Intern, NSF ACCESS Science, Univ. of Pennsylvania<br><i>Curriculum development, science teaching at Lee Elementary School</i>  | 2000    |

### 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 |
| NSF Pre-doctoral Graduate Research Fellowship                  | 2003-06 |

## Current External Funding

**GM124684-01 NIH/NIGMS R35 Maximizing Individual Researchers' Award for Early Stage Investigators** 09/17- 07/22  
"Causes and functional consequences of chromatin evolution"  
Role: PI

## Current Intramural Funding

**University Research Fund**, University of Pennsylvania  
"Epigenetic regulation of reproductive arrest"  
Role: PI

## Completed Funding

**1KR00GM107351 NIH/NIGMS R00** 07/15-06/18  
"Evolutionary and functional diversification of chromatin proteins"  
Role: PI

**DEB0806205 NSF/DEB Dissertation Improvement Grant** 07/08-06/09  
"Functional consequences of adaptive variation at chromatin remodeling genes"  
Role: co-PI

## Publications

### at Penn:

Drinnenberg, I., *et al.* (in press) EvoChromo: Towards a synthesis of chromatin biology and evolution. *Chromatin and Epigenetics* (invited Perspective).

Saint-Leandre, B., Nguyen, SB., and **M.T. Levine** (2019) Diversification and collapse of a telomere elongation mechanism. *Genome Research*. 29: 920-931.

Helleu, Q. and **M.T. Levine** (2018) Recurrent amplification of the Heterochromatin Protein 1 (HP1) gene family across Diptera. *Molecular Biology and Evolution*. **35**: 2375-2389.

Lee, Y.C.G. and **M.T. Levine** (2017) Germline genome protection on an evolutionary treadmill. *Developmental Cell*: **43(1)**: 1-3.

- Preview for: Parhard S. *et al.* (2017) Adaptive evolution leads to cross-species incompatibility in the piRNA transposon silencing machinery *Developmental Cell*: **43**:60-70.

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

pre-Penn:

**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., Lee Y.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 idiosyncratic? *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

|  |      |
|--|------|
| Carnegie Institution, Department of Embryology   | 2020 |
| New York Academy of Science, Genome Integrity Group  | 2019 |
| University of Rochester, Department of Biology   | 2019 |
| Society for Molecular Biology and Evolution Meeting  | 2019 |
| Stowers Institute, Kansas City   | 2019 |
| University of Kansas, Department of Molecular Biosciences  | 2019 |
| University of Chicago, Committee on Genetics, Genomics & Systems Biology<br><i>*Graduate student invited speaker</i> | 2019 |
| Institut für Populationsgenetik, Veterinärmedizinische, University of Vienna   | 2018 |
| Epigenetics Institute Retreat, University of Pennsylvania  | 2018 |
| University of Nebraska, School of Biological Sciences  | 2018 |
| University of Utah, Department of Human Genetics<br><i>*Graduate student invited speaker</i>                         | 2018 |
| Temple University, Department of Biology   | 2018 |
| Lehigh University, Department of Biology   | 2017 |
| Perelman School of Medicine, U of Pennsylvania, Department of Genetics   | 2017 |
| Bryn Mawr College, Department of Biology   | 2016 |

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| William Guy Forbeck Foundation Annual Forum on Aneuploidy and Genome Instability | 2016 |
| Villanova University, Department of Biology                                      | 2016 |
| University of Pennsylvania, Epigenetics of Cell Fate Symposium                   | 2016 |
| New York University, Center for Genomics and Systems Biology                     | 2014 |
| University of Pennsylvania, Evolution Cluster                                    | 2014 |
| Fred Hutchinson Cancer Research Center, Seattle WA                               | 2012 |

### Recent Conference Platform Presentations

**M.T. Levine** (2019) Intra-genomic conflict shapes *Drosophila* telomere biology. *International Meeting on Drosophila Heterochromatin*. Spoleto, Italy.

**M.T. Levine** (2018) Intra-genomic conflict shapes *Drosophila* telomere biology. Company of Biologists Workshop, Evo-chromo: towards an integrative approach of chromatin dynamics across eukaryotes. Sussex, UK.

Saint-Leandre, B and **M.T. Levine** (2018) Intra-genomic conflict shapes *Drosophila* telomere biology. *Society for the Study of Evolution*. Montpellier, France.

Saint-Leandre, B., Lee, Y.C.G, and **M.T. Levine** (2017) 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.

### Professional Development

|   |         |
|---|---------|
| Genetics Society of America Early Career Workshop           | 2018    |
| CTL Workshop on Inclusive Teaching Participant              | 2018    |
| Penn Faculty Pathways Program Participant                   | 2017-19 |
| SAS Search Committee Members Orientation Diversity Training | 2017    |
| CTL Workshop on Inclusive Teaching Participant              | 2016    |

## University Teaching

### 2019

Co-instructor: BIOL 221 *Molecular Biology and Genetics*

Instructor: BIOL433 *Genetics of Adaptation: How sex, pathogens, and the environment shape modern genomes*

### 2018

Instructor: BIOL 221 *Molecular Biology and Genetics*

Guest Lecturer: BIOL 483 Epigenetics

### 2017

Instructor: BIOL433 *Genetics of Adaptation: How sex, pathogens, and the environment shape modern genomes*

Guest Lecturer: BIOL 483 Epigenetics

Guest Lecturer: BIOL 410 Advanced Evolution

### 2016

Guest Lecturer: BIOL 540 Advanced Topics in Genetics

## Independent Study Students

|   |         |
|---|---------|
| Co-sponsor BIOL 499, Sanjana Adurty     | 2019    |
| Co-sponsor BIOL 499, Daphne Yang        | 2018    |
| Co-sponsor BIOL 399, Olivia Crocker     | 2019    |
| Co-sponsor BIOL 399, Giovanna Sena      | 2019    |
| Co-sponsor BIOL 399, Daphne Yang        | 2018    |
| Co-sponsor BIOL 499, James Nassur       | 2018,19 |
| Co-sponsor BIOL 399, Sanjana Adurty     | 2018    |
| Sponsor BIOL 399, MacKenzie Mauger      | 2017    |
| Co-sponsor BIOL 399, 499 Ying Xiong     | 2016-17 |
| Co-sponsor BIOL 399, 499 Molly Brothers | 2016-17 |

## Academic Service

### Biology Department

|   |       |
|---|-------|
| Faculty advisor for majors                              | 2019  |
| • Liam Forsythe (C'21)                                  |       |
| • Valentina Rodriguez (C'21)                            |       |
| Meet-A-Professor information session for biology majors | 2018  |
| Biology Seminar Series, Committee Chair                 | 2017- |
| Animal Behavior Search Committee Member                 | 2017  |

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| Biology majors information session speaker               | 2017  |
| 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  |
| Center for Teaching and Learning, Panel Member           | 2015  |

### **Graduate Student Committees**

(BGG = Biology Graduate Group, G&E = Genetics and Epigenetics)

|   |         |
|---|---------|
| Dissertation Committee Member, Ozan Kiratli, BGG    | 2017-   |
| Dissertation Committee Member, Jennifer Aleman, G&E | 2017-   |
| Dissertation Committee Member, Tomohiro Kumon, BGG  | 2017-   |
| Dissertation Committee Member, Riley Graham, BGG    | 2017-19 |
| Dissertation Committee Member, Rohini Singh, BGG    | 2016-   |
| Dissertation Committee Member, Alexandra Brown, BGG | 2016-   |
| Dissertation Committee Member, Un-Sa Lee, BGG       | 2016-   |
| Dissertation Committee Member, Run Jin, BGG         | 2016-   |
| Dissertation Committee Member, Michael Warner, BGG  | 2016-19 |
| General exam committee member, Tomohiro Kumon, BGG  | 2017    |
| General exam committee member, Michael Warner, BGG  | 2016    |

### **School of Arts and Sciences**

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| Time Management Workshop Speaker, “The First Two Years” Program     | 2018 |
| Velay Fellowship Selection Committee                                | 2016 |
| Judge, “Pop Talks” (Penn Graduate Women in Science and Engineering) | 2015 |

### **Community**

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| Walter Fitch Award/Student Travel Award Committee Member, Society for Molecular Biology and Evolution  | 2018  |
| Drosophila Image Award Committee Member, Genetics Society of America   | 2017- |
| Epigenetics and Chromatin Session Chair, Drosophila Research Conference  | 2017  |
| National Science Foundation Grant Review Panelist, ad hoc Reviewer   | 2014- |
| Reviewer— PLoS Genetics, Nucleic Acids Research, Molecular Ecology, Genetics, Molecular Biology and Evolution, Heredity, Proc. Roy. Soc, BMC Genomics, Genome Biology and Evolution, NY Academy of Sci |       |

### **Outreach**

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| “This Week in Evolution” (TWiEVO) Podcast Guest  | 2018    |
| Take your professor to lunch program (x5)  | 2018,19 |
| Philadelphia High School Teacher Professional Development Course<br>“How chromosomes travel from one generation to the next” | 2017    |

### Students Mentored at Penn

|  |       |
|--|-------|
| <b>Regina Fairbanks</b> , undergraduate work-study student | 2018- |
| <b>Will Gaines</b> , PURM student                          | 2018  |
| <b>Abigail DiVito</b> , Graduate Student                   | 2018- |
| <b>Alexander Gottfried</b> , PURM student                  | 2018- |
| <b>Samira Mehta</b> , Vagelos Scholar                      | 2018  |
| <b>Kevin Yang</b> , PURM Summer Student                    | 2017- |
| <b>Juan Botero</b> , PURM Summer Student                   | 2017- |
| <b>Christopher Pai</b> , BGS rotation student              | 2017  |
| <b>MacKenzie Mauger</b> , undergraduate work-study student | 2016- |
| <b>Jennifer Aleman</b> , BGS rotation student              | 2016  |

### Current Levine Lab Personnel

*(in order of arrival)*

|   |          |
|---|----------|
| <b>Courtney Leek</b> , BA, <i>Lab Manager/Research Specialist</i> | 09/2015- |
| <b>Bastien Saint-Leandre</b> , PhD, <i>Postdoctoral Scientist</i> | 04/2016- |
| <b>Juan Botero</b> , <i>Undergraduate Researcher</i>              | 06/2017- |
| <b>Abigail DiVito</b> , <i>Graduate Student</i>                   | 03/2018- |
| <b>Alexander Gottfried</b> , <i>Undergraduate Researcher</i>      | 03/2018- |
| <b>Regina Fairbanks</b> , <i>Undergraduate Researcher</i>         | 09/2018- |
| <b>Cara Brand</b> , PhD, <i>Postdoctoral Scientist</i>            | 09/2018- |