

Grace Yuh Chwen Lee

Lawrence Berkeley National Laboratory
One Cyclotron Road, MS977, Berkeley, CA 94720
grylee@lbl.gov (510) 486-6037
<http://grylee.science/>

Education

Ph.D. Population Biology, University of California, Davis 2012
B.S. Life Science, National Taiwan University 2006

Research Appointments

Assistant Professor July 2019-
Department of Ecology and Evolutionary Biology, University of California, Irvine

Postdoctoral fellow 2015–present
Lawrence Berkeley National Laboratory
Department of Molecular and Cell Biology, University of California, Berkeley
Mentor: Gary H. Karpen
Evolutionary consequences of the epigenetic effects of transposable elements

Postdoctoral fellow 2012–2015
Department of Ecology and Evolution, University of Chicago
Mentor: Manyuan Long
Evolution of essential functions driven by new genes that reshape gene interaction networks

Graduate student 2006–2012
Department of Evolution and Ecology, University of California, Davis
Dissertation Committee: Charles H. Langley (major advisor), David J. Begun, Graham Coop
*Population genomics of *Drosophila melanogaster* and its transposable elements*

Undergraduate researcher 2004–2006
Department of Life Science, National Taiwan University
Research advisor: Alex Hon-Tsen Yu
*Evolutionary history of MHC II in *Zacco**

Awards and Fellowships

NIH K99/R00 Pathway to Independence Award 2017–2022
Young Investigator Travel Award, Society for Molecular Biology and Evolution 2012, 2017
DeLill Nasser Award for Professional Development in Genetics, 2016
Genetics Society of America

The Allied Genetics Conference (TAGC) Travel Award, Genetics Society of America	2016
NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship	2014–2016
Graduate Student Poster Award 3rd prize, Genetics Society of America, 52nd Annual Drosophila Research Conference	2011
Daphne and Ted Pengelley Award in Evolutionary Biology, UC Davis	2010
Center for Population Biology Travel Award, UC Davis	2007, 2010
Summer Institute of Statistical Genetics Scholarship and Travel Award, University of Washington	2007
College of Life Science Dean’s Award, National Taiwan University	2006
Dean’s List, National Taiwan University	2003–2006

Research Grants

Chicago Biomedical Consortium Postdoctoral Research Award (\$14,680)	2015
NSF Doctoral Dissertation Improvement Grant (\$14,789)	2010–2012
Center for Population Biology Research Award, UC Davis (\$2,500)	2007, 2009
UCD & Humanities Graduate Research Award, UC Davis (\$1,500)	2007

Publications

- Lee, Y.C.G.** and M.T. Levine (2017) Germline genome protection on an evolutionary treadmill. *Developmental Cell* 43(1): 1-3.
Preview for “Parhad et al. (2017) Adaptive evolution leads to cross-species incompatibility in the piRNA transposon silencing machinery. *Developmental Cell* 43(1): 60-70.”
- Lee, Y.C.G.** and G.H. Karpen (2017) Pervasive epigenetic effects of *Drosophila* euchromatic transposable elements impact their evolution. *eLife* 6:e25762.
- Lee, Y.C.G.***, Q. Yang*, W. Chi*, W. Du, S.A. Turkson, C. Kemkemer, Z.Z. Zheng, X. Zhuang, and M. Long (2017) Genetic architecture of adult foraging behavior that is essential for the survival of *Drosophila melanogaster*. *Genome Biology and Evolution* 9 (5): 1357-1369.
*equal contribution
- Turissini, D.A., A.A. Comeault, G. Liu, **Y.C.G. Lee**, and D.R. Matute (2017) *Drosophila* hybrids have troubles finding food. *Evolution* 71-4:960-973.
- Lee, Y.C.G.**, C. Leek, and M.T. Levine (2017) Recurrent innovation at genes required for telomere integrity in *Drosophila*. *Molecular Biology and Evolution* 34 (2): 467-482.
- Lee, Y.C.G.** (2015) The role of piRNA-mediated epigenetic silencing in the population dynamics of transposable elements in *Drosophila melanogaster*. *PLoS Genetics* 11(6): e1005269.
- Lee, Y.C.G.**, C.H. Langley, and D.J. Begun (2014) Differential strengths of positive selection revealed by hitchhiking effects at small physical scales in *Drosophila melanogaster*. *Molecular Biology and Evolution* 31(4): 804-816.

- Lee, Y.C.G.*** and H.H. Chang* (2013) The evolution and functional significance of nested gene structures in *Drosophila melanogaster*. *Genome Biology and Evolution* 5(10):1978-1985. *equal contribution
- Lee, Y.C.G.** and C.H. Langley (2012) Long-term and short-term evolutionary impacts of transposable elements on *Drosophila*. *Genetics* 192(4):1411-32. (Issue Highlight)
- Langley, C.H., K. Steven, C.M. Cardeno, **Y.C.G. Lee**, D.R. Schrider, J.E. Pool, S.A. Langley, C. Suarez, R. Detig-Corbet, B. Kolaczowski, S. Fang, P.M. Nista, A.K. Holloway, A.D. Kern, C.N. Dewey, Y.S. Song, M.W. Hahn, and D.J. Begun (2012) Genomic variation in natural populations of *Drosophila melanogaster*. *Genetics* 192(2):533-98. (Issue Highlight, contributed the entire section of gene-based population and evolutionary genomic analysis.)
- Levine, M.T., C. McCoy, D. Vermaak, **Y.C.G. Lee**, M.A. Hiatt, F.A. Matsen, 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.
- Lee, Y.C.G.*** and J.A. Reinhardt* (2012) Widespread polymorphism in the positions of stop codons in *Drosophila melanogaster*. *Genome Biology and Evolution* 4(4):533-49. *equal contribution
- Lee, Y.C.G.** and C.H. Langley (2010) Transposable elements in natural populations of *Drosophila melanogaster*. *Philosophical Transactions of the Royal Society B* 365: 1219-1228.

Manuscripts in Preparation

- Lee, Y.C.G.**, G. Cavalli, and G.H. Karpen. Spatial associations between genomic regions enriched with heterochromatic marks impact genome evolution. (*in prep.*)
- Lee, Y.C.G.**, I.M. Ventura, G.R. Rice, D.Y. Chen, and M. Long. Rapid evolution of gained essential developmental functions of a young gene via interactions with other essential genes. (*pre-print on bioRxiv: 226936*)

Invited Seminars

- Pervasive epigenetic effects of transposable elements impact genome evolution
 Feb 2018 Laboratory of Genetics, University of Wisconsin, Madison
 Jan 2018 Department of Biology, University of Rochester
 Nov 2017 Department of Ecology and Evolutionary Biology, University of Toronto
 Oct 2017 Department of Ecology and Evolutionary Biology, UC Irvine
 May 2017 Center for Population Biology, UC Davis
 Feb 2017 Department of Biomolecular Engineering, UC Santa Cruz
- Evolutionary consequences of piRNA-mediated epigenetic silencing of transposable elements
 Apr 2015 Center for Theoretical Evolutionary Genomics, UC Berkeley
- Influence of internal genetic factors on genome evolution
 May 2012 Center for Population Biology, UC Davis
- Population genomics of *Drosophila* coding sequences

Selected Conference Presentations (*Oral)

- *Lee, Y.C.G. and G.H. Karpen. Pervasive epigenetic effects of euchromatic transposable elements impact genome evolution, 2018 Annual Meeting of the Society for Molecular Biology and Evolution, Yokohama, Japan 2018
- Lee, Y.C.G., G. Cavalli and G.H. Karpen, Epigenetic effects of transposable elements in 3D nuclear space, 59th Annual Drosophila Research Conference, Philadelphia, PA, USA 2018
- *Lee, Y.C.G. and G.H. Karpen. Pervasive epigenetic effects of *Drosophila* euchromatic transposable elements impact their evolution, 2017 Annual Meeting of the Society for Molecular Biology and Evolution, Austin, TX, USA. 2017
- *Lee, Y.C.G. and G.H. Karpen. Functional and evolutionary consequences of epigenetically silenced transposable elements in euchromatin, The Allied Genetics Conference (TAGC), Orlando, FL, USA. 2016
- *Lee, Y.C.G. The evolutionary consequences of piRNA-mediated epigenetic silencing of transposable elements in *Drosophila melanogaster*, 2015 Annual Meeting of the Society for Molecular Biology and Evolution, Vienna, Austria. 2015
- *Lee, Y.C.G., W. Chi, W. Du, Q. Yang, S.A. Turkson, N. VanKuren, X. Zhuang and M. Long. Genetic architecture of foraging behavior in natural *Drosophila melanogaster* population, 55th Annual Drosophila Research Conference, San Diego, CA, USA. 2014
- *Lee, Y.C.G. and C.H. Langley. Long-term and short-term evolutionary impacts of transposable elements on *Drosophila*, 2012 Annual Meeting of the Society for Molecular Biology and Evolution, Dublin, Ireland. 2012
- *Lee, Y.C.G., D.J. Begun and C.H. Langley. Small-scale hitchhiking effects in *Drosophila*, 53rd Annual Drosophila Research Conference, Chicago, IL, USA. 2012
- *Lee, Y.C.G. and C.H. Langley. Long-term and short-term evolutionary impacts of transposable elements on *Drosophila*, 3rd International Conference on Genomic Impact of Eukaryotic Transposable Elements, Asilomar, CA, USA. 2012
- *Lee, Y.C.G., D.J. Begun and C.H. Langley. Population genomics of *Drosophila* coding sequences, 2011 Annual Meeting of the Society for Molecular Biology and Evolution, Kyoto, Japan. 2011
- Lee, Y.C.G., D.J. Begun and C.H. Langley. Population genomics of *Drosophila* coding sequences, 52nd Annual Drosophila Research Conference, San Diego, CA, USA. (Graduate Student Poster Award from Genetics Society of America) 2011
- Lee, Y.C.G. and C.H. Langley. Lack of evidence for adaptive response of *Drosophila melanogaster* to recent *P element* invasion, 51st Annual Drosophila Research Conference, Washington D.C., USA. 2010

Teaching Experience

Teaching Assistant, Population and Quantitative Genetics Department of Evolution and Ecology, UC Davis	Spring 2007, 2009, Fall 2010
Teaching Assistant, Introduction to Biology Department of Evolution and Ecology, UC Davis	Winter 2010
Teaching Assistant, Introduction to Evolution Department of Evolution and Ecology, UC Davis	Spring 2008

Academic Services

Reviewer for PLoS Genetics (6 times), Genetics (6), Molecular Biology and Evolution (6), Genome Biology and Evolution (3), Molecular Ecology (2), Proceedings of the National Academy of Sciences, BMC Genomics, Scientific Reports, Journal of Molecular Biology and Evolution, Evolution letters	2010–present
Poster Award Judge, The Allied Genetics Conference (TAGC)	2016
Organizer, Evolution Discussion Group, UC Davis	2008–2010
Organizer, Coevolution Workshop, Center for Population Biology, UC Davis	2008

Professional Training

Drosophila Species Workshop, University of California, San Diego	2014
Summer Institute in Statistical Genetics, University of Washington	2007
Seminar on College Teaching, Teaching Resource Center, UC Davis	2007

References

Dr. Gary H. Karpen (postdoctoral mentor)

Senior Scientist, Lawrence Berkeley National Laboratory

Adjunct Professor, Department of Molecular and Cell Biology, University of California, Berkeley
ghkarpen@lbl.gov

Dr. Manyuan Long (postdoctoral mentor)

Edna K. Papazian Distinguished Service Professor

Department of Ecology and Evolution, University of Chicago
mlong@uchicago.edu

Dr. Charles H. Langley (Ph.D. major advisor)

Distinguished Professor of Genetics

Department of Evolution and Ecology, University of California, Davis
chlangley@ucdavis.edu

Dr. David J. Begun

Professor

Department of Evolution and Ecology, University of California, Davis

djbegun@ucdavis.edu

Dr. Harmit S. Malik

HHMI Investigator

Member, Fred Hutchinson Cancer Research Center

hsmalik@fhcrc.org

Dr. Graham Coop

Professor

Department of Evolution and Ecology, University of California, Davis

gmcoop@ucdavis.edu