

Paul Schmidt

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Education

Ph.D. 1999 Brown University, Advisor: David M. Rand
B.A.(Honors) 1993 College of the Holy Cross, magna cum laude

Positions

2009 - Associate Professor of Biology, University of Pennsylvania
2001 - 2009 Assistant Professor of Biology, University of Pennsylvania
1999 - 2001 Postdoctoral Associate, SUNY Stony Brook. Advisor: Walter F. Eanes

Research Awards as PI

NIH NIGMS

1R01GM100366-01 (current)

NSF DEB-PEP, Evolutionary Genetics

DEB-0921307

DEB-0823255

DEB-0710052

DEB-0542859

DEB-0236577

NSF DEB-PEP, Evolutionary Ecology (pending)

American Federation for Aging Research

A6152, Junior Investigator Award

Bingham Trust / Institute on Aging Pilot Research Grant

Publications

- Fabian, D.K., J. B. Lack, V. Mathur, C. Schlotterer, P.S. Schmidt, J.E. Pool and T. Flatt. 2015. Spatially varying selection shapes life history clines among populations of *Drosophila melanogaster* from sub-Saharan Africa. *J. Evol. Biol.* Doi: 10.1111/jeb.12607
- Cogni, R., K. Kuczynski, E. Lavington, S. Koury, E.L. Behrman, K.R. O'Brien, P.S. Schmidt and W.F. Eanes. 2015. Selection in the *Drosophila melanogaster* central metabolic genes appears driven by natural selection both within and between populations. 2015. *Proceedings Royal Soc. Series B*
- Paaby, A.B, A.O. Bergland, E.L. Behrman and P.S. Schmidt. 2014. An amino acid polymorphism in the *Drosophila* insulin receptor demonstrates pleiotropic and adaptive function in life history traits. *Evolution* 68(12): 3395-3409.
- Bergland, A., E.L. Behrman, K.R. O'Brien, P.S. Schmidt and D.A. Petrov. 2014. Genomic evidence of rapid and stable adaptive oscillations over seasonal timescales in *Drosophila*. *PLoS Genetics*.
- Lavington, E., R. Cogni, C. Kuczynski, S. Koury, E.L. Behrman, K.R. O'Brien, P.S. Schmidt and W.F. Eanes. 2014. A small system-high resolution study of metabolic adaptation in the glycolytic pathway to temperate climates in *Drosophila melanogaster*. *Mol. Biol. Evol.* 31(8): 2032-41.
- Maguire, S., P.S. Schmidt and A. Sehgal. 2014. Natural populations of *Drosophila melanogaster* reveal features of an uncharacterized circadian property: the lower temperature limit of rhythmicity. *J. Biol. Rhythms*. 29: 167-180.
- Cogni, R., C. Kuczynski, S. Koury, E. Lavington, E.L. Behrman, K.R. O'Brien, P.S. Schmidt and W.F. Eanes. 2013. The intensity of selection acting on the *couch potato* gene—spatial-temporal variation in a diapause cline. *Evolution* 68(2) 538-548.
- Fabian, D, Kapun, M., Nolte, V., Kofler, R., Schmidt, P.S., Schlotterer, C., Flatt, T. 2012. Genome-wide patterns of latitudinal differentiation among populations of *Drosophila melanogaster* from North America. *Molecular Ecology* 21(19): 4748-4769.

- Flight, P.A., M.A. O'Brien, P.S. Schmidt & D.M. Rand. 2012. Genetic structure and the North American postglacial expansion of the northern acorn barnacle, *Semibalanus balanoides*. Heredity doi:10.1093/jhered/esr083
- Schmidt, P.S. Evolution and mechanisms of insect diapause, a plastic life history syndrome. 2011. in *Molecular Mechanisms of Life History Evolution*, T. Flatt and A. Heyland (eds). Oxford University Press.
- Paaby, A.B., M. Blackett, A.A. Hoffmann & P.S. Schmidt. 2010. Identification of a candidate adaptive polymorphism for *Drosophila* life history by parallel independent clines on two continents. *Molecular Ecology* 19: 760-774.
- Emerson, K.J., A.M. Uyemra, K.L. McDaniel, P.S. Schmidt, W.E. Bradshaw, C.M. Holzapfel. 2009. Environmental control of ovarian dormancy in natural populations of *Drosophila melanogaster*. *Journal of Comparative Physiology* 196(9): 825-829.
- Taylor, G. M., N. Keyghobadi, & P.S. Schmidt. 2009. The geography of crushing: variation in claw performance of the invasive crab *Carcinus maenas*. *Journal of Experimental Marine Biology and Ecology* 377:48-53.
- Williams, K.D., P.S. Schmidt and M.B. Sokolowski. 2009. Photoperiodism in insects: molecular basis and consequences of diapause. in *Photoperiodism: the Biological Calendar*, R.J. Nelson, D.L. Denlinger and D. Somers (eds.). Oxford University Press.
- Flatt, T. & P.S. Schmidt. 2009. Integrating evolutionary and molecular genetics of aging. *Biochimica et Biophysica Acta – (General Subjects)*. Biochemical and Molecular Mechanisms of Aging– from Model Systems to Human Longevity: 1790(10): 951-962.
- Paaby, A.B., & P.S. Schmidt. 2009. Dissecting the genetics of longevity in *Drosophila melanogaster*. *Fly* 3: 1-10.
- Schmidt PS, Zhu CT, Das J, Batavia M, Yang L, Eanes WF. 2008. An amino acid polymorphism in the *couch potato* gene forms the basis for climatic adaptation in *Drosophila melanogaster*. *Proc. Nat. Acad. Sci. USA* 105: 16207 – 16211.
- Schmidt, P.S., E. A. Serrão, G. A. Pearson, C. Riginos, P. D. Rawson, T. J. Hilbish, S. H. Brawley, G. C. Trussell, E. Carrington, D. S. Wethey, J. W. Grahame, F. Bonhomme and D. M. Rand. 2008. Ecological genetics in the North Atlantic: environmental gradients and adaptation at specific loci. *Ecology* 89: 147-161.
- Phifer-Rixey, M., M. Heckman, G.C. Trussell and P.S. Schmidt. 2008. Maintenance of clinal variation for shell colour phenotype in the flat periwinkle *Littorina obtusata*. *Journal of Evolutionary Biology* 21: 966-978.
- Paaby, A.B. and P.S. Schmidt. 2008. Functional significance of allelic variation at *methuselah*, an aging gene in *Drosophila*. *PLoS ONE* 3(4) e1987. doi:10.1371/journal.pone.0001987.
- Schmidt, P.S. and A.B. Paaby. 2008. Reproductive diapause and life history clines in North American populations of *Drosophila melanogaster*. *Evolution* 62(5):1204-1215.
- Schmidt, P.S., M. Phifer-Rixey, G.M. Taylor and J.C. Christner. 2007. Genetic heterogeneity among intertidal habitats in the flat periwinkle, *Littorina obtusata*. *Molecular Ecology* 16: 2393-2404.
- Flowers, J.M., E. Sezgin, S. Kumagai, D.D. Duvernell, L.M. Matzkin, P.S. Schmidt and W.F. Eanes. 2007. Adaptive evolution of metabolic pathways in *Drosophila*. *Molecular Biology and Evolution* 24: 1347 – 1354.
- Schmidt, P.S. and D.R. Conde. 2006. Environmental heterogeneity and the maintenance of genetic variation for reproductive diapause in *Drosophila melanogaster*. *Evolution* 60(8): 1602-1611.
- Schmidt, P.S., A.B. Paaby, and M.S. Heschel. 2005. Genetic variance for diapause expression and associated life histories in *Drosophila melanogaster*. *Evolution* 59 (12): 2616-2625.
- Schmidt, K.S., J.L. Gallo, T. Giovannetti, C. Ferri, N. Sestito, D.J. Libon and P.S. Schmidt. 2005. The neuropsychological profile of alcohol related dementia suggests cortical and subcortical pathology. *Dementia and Geriatric Cognitive Disorders* 20 (5):286-291.
- Schmidt, P.S., L. M. Matzkin, M. Ippolito, and W.F. Eanes. 2005. Geographic variation in diapause incidence, life history traits and climatic adaptation in *Drosophila melanogaster*. *Evolution* 59 (8): 1721-1732.
- Duvernell, D.D., P.S. Schmidt, and W.F. Eanes. 2003. Clines and adaptive evolution in the *methuselah* gene region in *Drosophila melanogaster*. *Molecular Ecology* 12: 1277-1285.

- Rand D.M., T.B. Sackton, P.S. Spaeth and P.S. Schmidt. 2002. Ecological genetics of the *Mpi* and *Gpi* polymorphisms in the northern acorn barnacle and the spatial scale of neutral and non-neutral variation. *Integ. Comp. Biol.* 42: 825-836.
- Schmidt, P.S., D.D. Duvernell, and W.F. Eanes. 2000. Adaptive evolution of a candidate gene for aging in *Drosophila*. *Proc. Nat. Acad. Sci. USA* 97(20): 10861-10865.
- Schmidt, P.S. and D.M. Rand. 2001. Adaptive maintenance of genetic polymorphism in an intertidal barnacle: habitat- and life history stage-specific survivorship of *Mpi* genotypes. *Evolution* 55 (7): 1336-1344.
- Schmidt, P.S. 2001. The effects of diet and physiological stress on the evolutionary dynamics of an enzyme polymorphism. *Proc. R. Soc. Lond. B.* 268 (1462): 9-14.
- Schmidt, P.S., M. D. Bertness, and D.M. Rand. 2000. Environmental heterogeneity and balancing selection in the northern acorn barnacle, *Semibalanus balanoides*. *Proc. R. Soc. Lond. B.* 267: 379-384.
- Schmidt, P.S., and D.M. Rand. 1999. Intertidal microhabitat and selection at *Mpi*: interlocus contrasts in the northern acorn barnacle, *Semibalanus balanoides*. *Evolution* 53(1): 135-146.
- Bertness, M.D., G.H. Leonard, J.M. Levine, P.R. Schmidt, and A.O. Ingraham. 1999. Habitat modification by algal canopies: testing the relative contribution of positive and negative interactions in rocky intertidal communities. *Ecology* 80: 2711-2726.
- Leonard, G.H., J.M. Levine, P.R. Schmidt, and M.D. Bertness. 1998. Flow-driven variation in intertidal community structure in a Maine estuary. *Ecology* 79: 1395-1411.

Manuscripts in Review

- Behrman, E.L., S.S. Watson, K.R. O'Brien, M.S. Heschel and P.S. Schmidt. Seasonal life history adaptation in two species of *Drosophila*. *Journal of Evolutionary Biology*.
- O'Brien, K.R. and P.S. Schmidt. Polymorphism in the *couch potato* gene mediates the plasticity of life history traits in *Drosophila melanogaster*. *Functional Ecology*.
- Bergland, A.O., R. Tobler, J. Gonzalez, P.S. Schmidt and D.A. Petrov. Secondary contact and local adaptation contribute to genome-wide patterns of clinal variation in *Drosophila melanogaster*. *Molecular Ecology*.
- Zhu, C.T., C.A. Kuczynski, Shian-Ren Liou, M.G. Amella, P.S. Schmidt. Out-of-Africa balancing selection on the *couch potato* gene and the origin of reproductive diapause in *Drosophila melanogaster*. *Journal of Insect Physiology*.

Selected Professional Service and Activities

- 2008-2010 Faculty of 1000, Evolutionary Ecology section
- 2009 - Reviewing editor, *Journal of Evolutionary Biology*
- 2010 - Guest Editor, *PLoS Genetics*
- 2009 - National Scientific Advisory Council, American Federation for Aging Research

Memberships: Society for the Study of Evolution
 American Society of Naturalists
 Genetics Society of America
 Society for Molecular Biology and Evolution
 European Society for Evolutionary Biology

Reviewer, journals:

Acta Zoologica, Aging Cell, American Naturalist, Biological Journal of the Linnean Society, Biological Rhythms, BMC Evolutionary Biology, BMC Systems Biology, Ecological Entomology, Ecology, Ecology Letters, Evolution, Evolutionary Applications, Experimental Gerontology, Fly, Functional Ecology, Gene, Genetica, Genetical Research, Genetics, G3, Global Change Biology, Heredity, Invertebrate Biology, Journal of Comparative Physiology, Journal of Evolutionary Biology, Journal of Experimental Marine Biology and Ecology, Journal of Heredity, Journal of Insect Physiology, Marine Ecology Progress Series, Marine Biology, Mechanisms of Aging

and Development, Molecular Biology and Evolution, Molecular Ecology, PLoS Biology, PLoS Genetics, PLoS ONE, PNAS, Proceedings Roy. Soc. Lond. B, Quarterly Review of Biology, Trends in Ecology and Evolution, Trends in Genetics

Reviewer, grants:

National Science Foundation: Directorate for Biological Sciences (Divisions of Environmental Biology, Emerging Frontiers, Integrative Biology and Neuroscience, Integrative Organismal Systems, Molecular and Cellular Biosciences); Directorate for Geosciences (Division of Ocean Sciences); Biocomplexity in the Environment: Integrated Research and Education in Environmental Systems, Genome-Enabled Environmental Sciences and Engineering; Panel Member, Evolutionary Ecology Panel of Population and Evolutionary Processes; Panel Member, Evolutionary Genetics Panel of PEP

National Institute of Aging

Natural Sciences and Engineering Research Council of Canada

Natural Environment Research Council, U.K.

American Philosophical Society

Arthropod Genomics Center

National science foundations of Israel, France, Portugal, Netherlands

US-Israel Binational Science Foundation

Icelandic Research Fund

Research Grants Council of Hong Kong

AAS external reviewer for Sea Grant, Rhode Island

2001 – present. Thirty-five undergraduates at Penn have conducted honors research in my laboratory, sixteen have been sponsored through the federal work study program, and I have hosted twelve high school student volunteers. Approximately half of these students are women and a third are from historically under-represented cultural groups.

2001 – present. Eleven graduate students supervised, thirty-four PhD thesis committees.