Mark A. Phillips

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Education

2018	Ph.D. Biological Sciences, University of California, Irvine
2011	B.S. Biological Sciences, University of Florida, Gainesville

Appointment History

2021-present	Assistant Professor, Department of Integrative Biology, Oregon State University
2018-2021	Postdoctoral Researcher, Department of Integrative Biology, Laboratory of Dr. Molly Burke, Oregon State University
2012-2018	Graduate Researcher, Department of Ecology and Evolutionary Biology, Laboratory of Dr. Michael Rose, University of California, Irvine

Awards & Funding

2024-2029	NIH Maximizing Investigators' Research Award
2024-2026	Award from Ken Fisher to support work on the genetic basis of extractive variation in Redwoods (Co-pi with Drs. Laurence Schimleck and Gerald Presley in OSU Wood Science & Engineering)
2023	University of Washington Nathan Shock Center Pilot Project Award
2019 - 2021	NSF Postdoctoral Research Fellowship in Biology
2014 - 2018	Department of Education GAANN Fellowship
2016	NSF Doctoral Dissertation Improvement Grant

Publications

In review

Scott, N.A., Afolabi, J.M., Marshall, A.G., Schafer, J.C., Baskerville, V.R., Prasad, P., Kadam, A.A., Som de Cerff, C., Whisenant, T., Phillips, M.A., Tomar, D., McReynolds, M.R., Hinton, A., Jr., and Neal, S.E. Derlin-mediated ERAD of lipid regulator ORMDL3 safeguards mitochondrial function. **In review**: *Nature Cell Biology.* (Preprint: https://doi.org/10.64898/2026.02.27.708653)

White, E., Marney, L., **Phillips, M.A.**, Scott, J., Parkin, A., and Weis, V.M. Abundance and diversity of lipid compounds in *Exaiptasia diaphana* is altered as a function of symbiotic state and life stage. **In review:** *Marine Biology.*

Hinton, A.O., Jr., Masenga, S.K., Baskerville, V., Petrovic, M., Rodriguez, B., Hubert, D.L., Miller-Fleming, T.W., Koo, Y.D., Katti, P., Venkhatesh, P., Kirabo, A., Garza Lopez, E., Crabtree, A., Marshall, A., Blake, C., Dash, C., Prasad, P., Murphy, A., Afolabi, J., **Phillips, M.A.,** Evans, C., Scudese, E., Schafer, J.C., Berry, J., Mobley, B.C., Mobley, H., Winn, N.C., Khan, M.M., Pulatani, D., Sorrentino, J., Gamble-George, J., McReynolds, M., and Wanjalla, C. Nutrient State, Aging, and Diet Modulate SAM50-Dependent Mitochondrial Remodeling and Systemic Metabolic Signatures. **In review***:* *Experimental & Molecular Medicine.* (Preprint: https://doi.org/10.21203/rs.3.rs-8704245/v1)

Evans, C., Scudese, E., Schafer, J.C., Berry, J., Mobley, B.C., Mobley, H., Winn, N.C., Khan, M.M., Pulatani, D., Sorrentino, J., Gamble-George, J., McReynolds, M., Hinton, A.O., Jr., Masenga, S.K., Baskerville, V., Petrovic, M., Rodriguez, B., Hubert, D.L., Miller-Fleming, T.W., Koo, Y.D., Katti, P., Venkhatesh, P., Kirabo, A., Garza Lopez, E., Crabtree, A., Marshall, A., Blake, C., Dash, C., Prasad, P., Murphy, A., Afolabi, J., **Phillips, M.A.,** and Wanjalla, C. The role of MICOS in modulating mitochondrial dynamics and structural changes in vulnerable regions of Alzheimer's Disease. **In review**: *Nature Neuroscience.* (Preprint: https://doi.org/10.64898/2025.12.13.693635)

Katti, P., Prasad, P., Masenga, S.K., Venkhatesh, P., Vue, Z., Marshall, A.G., Rodriguez, B., Le, H., Garza-Lopez, E., Murphy, A., Jenkins, B., Kadam, A., Shao, J., Crabtree, A., Martin, P., Evans, C., **Phillips, M.A**., Hubert, D.L., Wandira, N., Ochayi, O.M., Tomar, D., Williams, C.R., Gaddy, J., Tomeau, B., Bell, L., Gillyard, T., Hamilton, M., Sharma, V., Khan, M.M., Zaganjor, E., Ajijola, O.A., Scudese, E., Miller Fleming, T.W., Kinder, A., Dash, C., Quintana, A.M., Mobley, B.C., Berry, J.D., Jadiya, P., Dai, D.-F., Kirabo, A., Kovtun, O., Schafer, J.C., Schaffer, S., Pereira, R.O., McReynolds, M.R., and Hinton, A., Jr. The MICOS Complex Regulates Mitochondrial Structure and Oxidative Stress During Age-Dependent Structural Deficits in the Kidney. **In review:** *Aging Cell* (Preprint: https://doi.org/10.1101/2024.06.09.598108)

First, co-first, and senior authored publications (* indicates equal contribution)

1. Hubert, D.L., Porter, D.L., Robinson, R.D., Mijares, M.E., Ahmadian, E., Arnold, K.R., and **Phillips, M.A**. Signal, noise, and sampling: How pool size and replication shape metabolomic inference. **In Press**: *G3: Genes, Genomes, Genetics.* (Preprint: https://doi.org/10.64898/2026.04.07.717001).

2. Arnold, K.R., Greenspan, Z.S., Robinson, R.D., Pupo, A., Chavarin, V.V., Chang, K., Cannell, C.O., Qi, M., Mueller, L.D., Rose, M.R., and **Phillips, M.A**. Beyond Fixation: Persistent Genetic Variation Under Intense Selection. *Molecular Biology and Evolution* 43:msag188. https://doi.org/10.1093/molbev/msag188

3. **Phillips M.A.,** Sandoval-Powers M., Briar R.K., Scaffo M., Zhou S., Burke M.K. **(2026)** Strength of selection potentiates distinct adaptive responses in an evolution experiment with outcrossing yeast. G*3:Genes, Genomes, Genetics* 16:jkag009**.** https://doi.org/10.1093/g3journal/jkag009

4. Hubert D.L., Arnold K.R., Greenspan Z.G., Pupo A., Robinson R.D., Chavarin V.V., Barter T.B., Djukovic D., Raftery D., Vue Z., Hinton A., McReynolds M.R., Harrison B.R., **Phillips M.A.** (**2025**) Selection for early reproduction leads to accelerated aging and extensive metabolic remodeling in *Drosophila melanogaster* populations. *Genome Biology and Evolution* 17:evaf082. https://doi.org/10.1093/gbe/evaf082

5. **Phillips M.A**., Arnold K.R., Vue Z., Beasley H., Garza Lopez E., Marshall A., Morton D., McReynolds M.R., Barter T.T., Hinton A. **(2022)** Combining metabolomics and experimental evolution reveals key mechanisms underlying longevity differences in laboratory evolved Drosophila melanogaster populations. *International Journal of Molecular Sciences* 23:1067. https://doi.org/10.3390/ijms23031067

6. **Phillips M.A.**, Kutch I.C., McHugh K.M., Taggard S.K., Burke M.K. **(2021)** Crossing design shapes patterns of genetic variation in synthetic recombinant populations of *Saccharomyces cerevisiae. Scientific Reports* 11:19551. https://doi.org/10.1038/s41598-021-99026-0

7. **Phillips M.A.** and Burke M.K. **(2021)** Can laboratory evolution experiments teach us about natural populations? *Molecular Ecology* 30:877-879. https://doi.org/10.1111/mec.15790

8. **Phillips M.A.**, Kutch I.C., Long A.D., Burke M.K. (**2020**) Increasing time-sampling in an evolve and resequence experiment with outcrossing *Saccharomyces cerevisiae* reveals multiple paths of adaptive change. *Molecular Ecology* 29:4898-4912. https://doi.org/10.1111/mec.15687

9. **Phillips M.A.***, Rutledge G.A.*, Kezos J.N., Talbott A., Matty S., Arian H., Mueller L.D., Rose M.R, Shahrestani P. (**2018**) Effects of evolutionary history on genome-wide and phenotypic convergence in Drosophila populations. *BMC Genomics* 19:743. https://doi.org/10.1186/s12864-018-5118-7

10. **Phillips M.A**. and Rose M.R. (**2018**) Experimental evolution. Oxford Bibliographies in Evolutionary Biology. New York: Oxford University Press. doi:10.1093/OBO/9780199941728-0107. 10.1093/OBO/9780199941728-0107

11. Graves J.L.*, Hertweck K.L.*, **Phillips M.A.***, Han M.V.*, Cabral L.G., Barter T.T., Greer L.F., Burke M.K., Mueller L.D., and Rose M.R. (**2017**) Genomics of parallel experimental evolution in Drosophila. *Molecular Biology and Evolution* 34:831-842. https://doi.org/10.1093/molbev/msw282

12. **Phillips M.A.**, Long A.D., Greenspan Z.S., Greer L.F., Burke M.K., Bryant V., Matsagas K.C., Rizza C.L., Mueller L.D., and Rose M.R. (**2016**) Genome-wide analysis of long-term evolutionary domestication in Drosophila melanogaster. *Scientific Reports* 6:39281. https://doi.org/10.1038/srep39281

Co-authored publications

13. Schimleck L.R., **Phillips M.A**., Mora C., Moya Roque R., Apiolaza L., Morrell J. **(2026)** Durable Heartwood: Challenges and Opportunities. *Current Forestry Reports* 12:15. https://doi.org/10.1007/s40725-026-00276-w

14. Scudese E., Vue Z., Katti P., Marshall A.G., Demirci M., Vang L., Garza López E., Neikirk K., Shao B., Le H., Stephens D., Hall D.D., Rostami R., Rodman T., Kabugi K., Harris C., Shao J., Mungai M., AshShareef S.T., Hicsasmaz I., Manus S., Wanjalla C., Whiteside A., Dasari R., Williams C., Damo S.M., Gaddy J.A., Glancy B., Dantas E.H.M., Kinder A., Kadam A., Tomar D., Scartoni F., Baffi M., McReynolds M.R., **Phillips M.A.,** Cooper A., Murray S.A., Quintana A.M., Exil V., Kirabo A., Mobley B.C., Hinton A. (**2025**) 3D mitochondrial structure in aging human skeletal muscles: Insights into MFN-2 mediated changes. *Aging Cell e70054.* https://doi.org/10.1111/acel.70054

15. Greenspan Z.S., Barter T.T., **Phillips M.A**., Ranz J.M., Rose M.R., Mueller L.D. (**2024**) Genomewide architecture of adaptation in experimentally evolved Drosophila characterized by widespread pleiotropy. *Journal of Genetics* 103:8. https://doi.org/10.1007/s12041-023-01460-8

16. Vue Z., Garza-Lopez E., Neikirk K., Katti P., Vang L., Beasley H.K., Jianqiang S., Marshall A.G., Crabtree A., Murphy A.C., Jenkin B.C., Prasad P., Evans C., Taylor B., Mungai M., Killion M., Stephens D., Christensen T.A., Lam J., Rodriguez B., **Phillips M.A.**, Daneshgar N., Koh H-J., Koh A., Davis J., Devine N., Muhammod S., Scudese E., Arnold K.R., Chavarin V.V., Robinson R.D., Chakraborty M., Gaddy J.A., Sweetwyne M.T., Wilson G., Zaganjor E., Kezos J.N., Dondi C., Reddy A.K., Glancy B., Kirabo A., Quintana A.M., Dai D-F., Ocorr K., Murray S.A., Damo S.M., Exil V., Riggs B., Mobley B.C., Gomez J.A., McReynolds M.R., Hinton A. (**2023**). 3D reconstruction of murine mitochondria reveals changes in structure during aging linked to the MICOS complex. *Aging Cell* e14009. https://doi.org/10.1111/acel.14009

17. Vue Z., Neikirk K., Vang L., Garza-Lopez E., Christensen T.A., Shao J., Lam J., Beasley H.K., Marshall A.G., Crabtree A., Anudokem Jr J., Rodriguez B., Kirk B., Bacevac S., Barongan T., Shao B., Stephens D.C., Kabugi K., Koh H.J., Koh A., Evans C.S., Taylor B., Reddy A.K., Miller-Fleming T., Actkins K.V., Zaganjor E., Daneshgar N., Murray S.A., Mobley B.C., Damo S., Gaddy J.A., Riggs B., Wanjalla C., Kirabo A., McReynolds M., Gomez J.A., **Phillips M.A.**, Exil V., Dai D-F., Hinton A. **(2023)** Three-dimensional mitochondria reconstructions of murine cardiac muscle changes in size across aging. *American Journal of Physiology: Heart and Circulatory Physiology* 325:H965-H982 https://doi.org/10.1152/ajpheart.00202.2023

18. Vue Z., Vang C., Vue N., Kamalumpundi V., Barongan T., Shao B., Huang S., Vang, L, Vue M., Vang N., Shao J., Coombes C., Katti P., Liu K, Yoshimura K., Biete M., Dai D-F., **Phillips M.A.,** Behringer R.R. **(2023)** Asian Americans in STEM are not a monolith. *Cell* 186:3138-3142. 10.1016/j.cell.2023.06.017

19. Ahmed I., Armstrong A., Clemons T.A., Clune-Taylor C., Love-Rutledge S.T., **Phillips M.A**., Rogers C.D., Williams M.J. **(2023)** How do DEI initiative impact STEMM, and we do we still need them? *Cell* 186:2506-2509. https://doi.org/10.1016/j.cell.2023.05.015

20. Kezos J.N., Barter T.T., **Phillips M.A.**, Cabral L.G., Greenspan Z.S., Arnold K.R., Azatian G., Buenprostro J.E., Bhangoo P.S., Khong A., Reyes G.T., Rahman A., Humphrey L.A., Bradley T.J., Mueller L.D., Rose M.R. **(2023)** Building bridges from genome to physiology using

machine learning and Drosophila experimental evolution. *Physiological and Biochemical Zoology* 96:192–205. https://doi.org/10.1086/724827

21. Shahrestani P., King E., Ramezan R., **Phillips M.A.**, Riddle M., Thornburg M., Greenspan Z.S., Estrella Y., Garcia K., Chowdhury P., Malarat G., Zhu M., Rottshaefer S.M., Wraight S., Griggs M., Vandenberg J., Long A.D., Clark A.G., Lazzaro B.P. **(2021)** The molecular architecture of Drosophila melanogaster defense against Beauveria bassiana explored through evolve and resequence and quantitative trait locus mapping. *G3: Genes, Genomes, Genetics* 11:324. https://doi.org/10.1093/g3journal/jkab324

22. Wing K.M., **Phillips M.A.**, Baker A.R., Burke M.K. (**2020**) Consequences of cryopreservation in diverse natural isolates of *Saccharomyces cerevisiae*. *Genome Biology and Evolution* 12:1302-1312. https://doi.org/10.1093/gbe/evaa121

23. Kezos J.N., **Phillips M.A**., Thomas M.D., Ewunkem A.J., Rutledge G.A., Barter T.T., Santos M.A., Wong B.D., Arnold K.R., Humphrey L.A., Yan A., Nouzille C., Sanchez I., Cabral L.G., Bradley T.J., Mueller L.D., Graves J.L., Rose M.R. (**2019**) Genomic and phenotypic effects of selection for starvation resistance in Drosophila. *Physiological and Biochemical Zoology* 92:591-611. https://doi.org/10.1086/706099

24. Barter T.T., Greenspan Z.S., **Phillips M.A**., Mueller L.D., Rose M.R., Ranz J.M. (**2019**) Drosophila transcriptomics with and without ageing. *Biogerontology* 20:699-710. https://doi.org/10.1007/s10522-019-09823-4

25. Mueller L.D., **Phillips M.A**., Barter T.T., Greenspan Z.S., Rose M.R. (**2018**). Genome-wide mapping of gene-phenotype relationship in experimentally evolved populations. *Molecular Biology and Evolution* 35:2085-2095. https://doi.org/10.1093/molbev/msy113

26. Rose M.R., Greer L.F., Phung K.H., Rutledge G.A., **Phillips M.A.**, Anderson C.N.K., and Mueller L.D. (**2017**). A Hamiltonian Demography of Life History. In R. Shefferson, O. Jones, & R. Salguero-Gómez (Eds.), *The Evolution of Senescence in the Tree of Life* (pp. 40-55). Cambridge: Cambridge University Press. https://doi.org/10.1017/9781139939867.003

27. Burke M.K., Barter T.B., Cabral L.G., Kezos J.N., **Phillips M.A**., Rutledge G.A., Phung K.H., Chen R.H., Nguyen H.D., Mueller L.D., and Rose M.R. (**2016**) Rapid convergence and divergence of life-history in experimentally evolved Drosophila melanogaster. *Evolution* 70:2085-2098. https://doi.org/10.1111/evo.13006

28. Rose M.R., Cabral L.G., Kezos J.N, **Phillips M.A**., Smith B.L., and Burnham T.C. (**2015**). Four steps towards the control of aging: Following the example of infectious disease. *Biogerontology* 17:21-31. 10.1007/s10522-015-9588-6

29. Rose M.R., Rutledge, G.A., Phung K.H., **Phillips M.A**., Greer L.F., and Mueller L.D. (**2014**) An evolutionary and genomic approach to the challenges and opportunities for eliminating aging. *Current Aging Science* 7:54-49. 10.2174/1874609807666140521110314

30. Rose M. R, Cabral L.G., **Phillips M.A**., Rutledge G.A., Phung K.H., Mueller L.D., and Greer L.F. (**2014**). The Great Evolutionary Divide: Two Genomic Systems Biologies of Aging. *Interdiscip. Top. Gerontol.* 40:63-73. https://doi.org/10.1159/000364930

Contributed Presentations (first author only)

2025 – University of Oregon Institute of Ecology and Evolution Seminar (invited talk)
2024 – George Martin Memorial Geoscience Symposium (invited talk)
2024 – Brazilian Scientific Journey on Mitochondrial Deregulation (invited talk)
2024 – PopGen Vienna Seminar Series (invited talk)
2023 – Oregon State University Department of Botany and Plant Pathology Seminar Series (invited talk)
2022 – Evolution 2022 (talk)
2022 – University of Florida Department of Biology Seminar Series (invited talk)
2022 – North Carolina A&T State University Department of Biology Seminar Series (invited talk)
2021 – WSU Vancouver Fall Seminar Series (invited talk)
2021 – OSU Center for Quantitative Life Sciences Conference (invited talk)
2021 – CN Yang Scholars Programme at Nanyang Technological University (invited talk)
2019 – Evolution 2019 (invited talk)
2019 – OSU CGRB Conference (poster)
2018 – Society for Molecular Biology and Evolution (poster)
2017 – Directed Evolution and Synthetic Biology Group at UC Irvine (invited talk)
2015 – Gordon Research Conference on Ecological and Evolutionary Genomics (poster)
2015 – Plant & Animal Genome XXIII Conference (talk)
2014 – 55th Annual Drosophila Research Conference (poster)

Mentoring and Outreach

Experiential Learning Course for College Hill Highschool (2024-present)
My lab has designed an experiential learning course for students at College Hill High School. College Hill is an alternative high school in Corvallis, Oregon for students at high risk of dropping out. Over eight weeks and under our guidance, students in the course use fruit flies to test the effects of different dietary supplements on longevity and physiological performance. This work is supported by my lab and an IMAGINE Grant from the Corvallis Public School System.

Course-based Undergraduate Research Experience for Invertebrate Biology Lab (2024-present)
My lab has partnered with Dr. Nathan Kirk, the primary instructor for Invertebrate Biology Lab, to develop and implement a CURE. In the first five weeks, students learn to work with Drosophila and perform assays directly aligned with my research program. These efforts have already produced data that will appear in two graduate student theses, and undergraduates who contributed through the CURE will be included as consortium authors on resulting publications.

Member of OSU's DEJI Action Plan Committee (2020 – 2021)
During my time on this committee, we were tasked with authoring a Diversity Action Plan (https://science.oregonstate.edu/diversity-plan) for Oregon State University's College of Science. This plan outlines actions that will be taken over four years to promote diversity, equity, and inclusion within the college.

Policy Investigation Task Force in the Department of Integrative Biology at OSU (2020 – 2021)
During my time on this committee, we were tasked with reviewing past faculty hiring policy within the Department of Integrative Biology and recommending new policies to make future faculty searches more equitable.

Mentoring Undergraduate Researchers, Dr. Molly Burke's Lab, Oregon State University (2019-2021)
During my post doc with Dr. Burke, I mentored and trained three undergraduate researchers who made significant contributions work in the lab on the genetic basis of ethanol resistance in yeast. All three students were from underrepresented groups within Ecology and Evolutionary Biology.

Mentoring Undergraduate Researchers, Dr. Michael Rose's Lab, UC Irvine (2012-2018)
During my time as a graduate student in the Rose Lab, I mentored and trained dozens of undergraduate research assistants. I also guided five students who conducted their own experiments for publication in UC Irvine's undergraduate research journal.

Resident Scientist at Santa Ana High School (2013 – 2018)
This is a program I started with six other graduate students in 2013. Over the course of a month every year, we went into biology classrooms at Santa Ana High School to guide students through experiments aimed at reinforcing core course content. I personally led students through bacterial transformation experiments and introduced them to the field of computation biology. We also devoted time to answering student questions about navigating higher education (e.g. application process, finding scholarships, pursuing advanced degrees, etc.) and careers in STEM.

Irvine Unified School District Science Fair Judge (2014 – 2015)
I served as a science fair judge for two years. In addition to helping select winners, as judges we were also tasked with discussing projects with students and providing feedback.

Professional Development

2019	Cold Spring Harbor Yeast Genetics and Genomics Course

Service & Society Memberships

Reviewer: Animal Genetics **(1)**, Molecular Biology and Evolution **(4)**, Molecular Ecology **(2)**, BMC Biology **(1)**, Genetics **(1)**, Genome Biology and Evolution **(1)**, Evolution Letters **(3)**, EMBO Journal (1)

Memberships: Society for the Study of Evolution, Genetics Society of America