

MEGAN PHIFER-RIXEY

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PROFESSIONAL POSITIONS

Drexel University, Philadelphia, PA

Assistant Professor, January 2023-present

Teaching: Class, Format (# of semesters)

Bio 132H Genetics and Evolution (Honors), lecture (1)

Monmouth University, West Long Branch, NJ

Associate Professor, Fall 2022-Dec 2022

Assistant Professor, Fall 2016-Spring 2022.

BY109 Introduction to Biology, Evolution and Biodiversity, lecture (3), lab (2)

BY110 Introduction to Biology, Cellular and Molecular Biology, lecture (4), lab (3)

BY216 Genetics, lecture (5), lab (4)

BY398 Research Methods in Evolution, lab (1)

BY398 Urban Evolution, seminar (1)

BY424 Evolution, lecture (4)

BY450 Research in Molecular and Cellular Physiology, lab (3)

BY495 Senior Seminar, seminar (1)

Postdoctoral Scholar, Research Scientist, University of California, Berkeley, Berkeley, CA, 2013-2016; Environmental adaptation in *Mus musculus* with Dr. Michael W. Nachman

Postdoctoral Research Associate, University of Arizona, Tucson, AZ, 2009-2013

Adaptation and speciation in *Mus musculus* with Dr. Michael W. Nachman

EDUCATION

University of Pennsylvania, Philadelphia, PA

Ph.D., Biology, 2009

Dissertation: Spatially varying selection on shell color in the flat periwinkle *Littorina obtusata* with Dr. Paul S. Schmidt

Teaching Assistant (10 semesters), Certificate in College and University Teaching Center for Teaching and Learning: Senior Graduate Fellow for Teaching Excellence Fall 2008-Spring 2009; Graduate Fellow for Teaching Excellence Fall 2007-Spring 2008; TA Training Graduate Coordinator 8/2007, 8/2008; TA Training Workshop Leader 8/2006

Duke University, Durham, NC

B.S., Biology with Distinction, *Magna cum laude*, 2001; Semester Abroad: Organization for Tropical Studies, Costa Rica; Duke University Marine Lab

GRANTS AND AWARDS

External Research Funding

National Science Foundation. CAREER: The genomics of urbanization in house mice. PI: Megan Phifer-Rixey. Fall 2021-Fall 2026.

Extreme Science and Engineering Discovery Environment (XSEDE), NSF. Co-PI with Dr. Michael Nachman. Environmental adaptation in house mice. 2013-December 2022.
Achelis & Bodman Foundation. Investigating environmental DNA (eDNA) as a tool for biological monitoring of the lower Hudson-Raritan River Estuary. PIs: Jason Adolf, Megan Phifer-Rixey, and Keith Dunton. Fall 2019-Summer 2022.
National Science Foundation. Doctoral Dissertation Improvement Grant, 2007-2009.

Internal Research Funding, Monmouth University

Creativity and Research Grant. Rapid adaptation and range expansion in house mice. Spring 2020.
Urban Coast Institute. Faculty Fellowship. Closing the gap: genetic tools for our changing oceans. Summer stipend, course releases (4), and research funds. Fall 2019-Summer 2021.
Summer Faculty Fellowship. Summer 2019.
Urban Coast Institute. Faculty Enrichment Grant: Using population genetics to inform management of New Jersey fisheries. Spring 2018-present.

Other Funding and Awards

Monmouth University, Office of the Provost and the Intercultural Center. Diversity Innovation Grant: Genetics, Genomics, and Racism. Spring 2021. With Dr. Jennifer McGovern and student coordinator, Cameron Gaines.
<https://www.monmouth.edu/news/panel-genetics-genomics-and-racism-april-8/>
European Society for Evolutionary Biology Outreach Grant. DNA Unraveled: Strawberry DNA Extraction. Fall 2017.
Genetics Society of America, TAGC Travel Grant, 2016; DeLill Nasser Award, 2012.
Summer Institute for Statistical Genetics Scholarship, 2009.
American Genetic Association, Travel Grant, 2009.
Marie Curie ITN, Travel Grant, Theory of Speciation Workshop, 2009.
University of Pennsylvania, Dissertation Completion Fellowship, Fall 2008-Spring 2009.
Malacological Society of London, Travel Grant, International Society of Littorinid Biology and Evolution, 2008.
University of Pennsylvania, Dean's Awards for Distinguished Teaching by Graduate Students, 2007.
University of Pennsylvania, Binns-Williams Fund for Research, 2005, 2006.

PUBLICATIONS

Xuereb, A. Rougemont, Q., Tiffin, P., Xue, H., and **M. Phifer-Rixey**. 2021. Individual-based eco-evolutionary models for understanding adaptation in changing seas. *Proceedings of the Royal Society B*. 288 (1962), 20212006.
Ferris KG, Chavez AS, Suzuki TA, Beckman EJ, **Phifer-Rixey M**, Bi K, Nachman MW. 2021. The genomics of rapid climatic adaptation and parallel evolution in North American house mice. *PLoS Genet*. 17(4): e1009495.
Phifer-Rixey, M., Harr, B., and J. Hey. 2020. Further resolution of the house mouse (*Mus musculus*) phylogeny by integration over isolation-with-migration histories. *BMC Evol Biol*. 20:120.

- Suzuki, TA, Martins, FM, **Phifer-Rixey, M.**, Nachman, MW. 2020. The gut microbiota and Bergmann's rule in wild house mice. *Molecular Ecology* 29: 2300–2311.
- Suzuki, T.A., **Phifer-Rixey, M.**, Mack, K.L., Sheehan, M.J., Lin, T., Bi, K., and M.W. Nachman. 2019. Host genetic determinants of the gut microbiome of wild mice. *Molecular Ecology*. 28: 3197– 3207.
- Mack, K.L., **Phifer-Rixey, M.**, Harr, B., and M.W. Nachman. 2019. Gene expression networks across multiple tissues are associated with rates of molecular evolution in wild house mice. *Genes* 10(3), 225.
- Mack, K.L., Ballinger, M.A., **Phifer-Rixey, M.**, and M.W. Nachman. 2018. Gene regulation underlies environmental adaptation in house mice. *Genome Research*. gr.238998.118. doi: 10.1101/gr.238998.118.
- Moeller, A.H., Suzuki, T.A., **Phifer-Rixey, M.** and M.W. Nachman. 2018. Transmission modes of the mammalian gut microbiota. *Science* 362 (6413): 453-457.
- Phifer-Rixey, M.**, Bi, K., Ferris, K.G., Sheehan, M.J., Lin, D., Mack, K.L., Keeble, S.M., Suzuki, T., Good, J.M., and M.W. Nachman. 2018. The genomic basis of environmental adaptation in house mice. *PLoS Genet* 14(9): e1007672.
- Weyand, N., Ma, I., **Phifer-Rixey, M.**, *et al.* 2016. Isolation of a new species of *Neisseria* from the wild house mouse, *Mus musculus*. *International Journal of Systematic and Evolutionary Microbiology*. 66(9):3585-3593.
- Phifer-Rixey, M.** and M. W. Nachman 2015. The natural history of model organisms: Insight into mammalian biology from the wild house mouse, *Mus musculus*. *eLife*. 4:e05959 (review)
- Phifer-Rixey, M.**, Bomhoff, M., and M.W. Nachman. 2014. Genome-wide patterns of differentiation among house mouse subspecies. *Genetics* 198(1):283-297.
- Phifer-Rixey, M.**, Bonhomme, F., Boursot, P., Churchill, G.A., Pialek, J., Tucker, P., and M.W. Nachman. 2012. Adaptive evolution and effective population size in wild house mice. *Molecular Biology and Evolution* 29(10):2949-2955.
- Phifer-Rixey, M.**, Heckman, M., Trussell, G. and P.S. Schmidt. 2009. Maintenance of clinal variation for shell colour phenotype in the flat periwinkle *Littorina obtusata*. *Journal of Evolutionary Biology* 21(4):966-978.
- Schmidt, P.S., **Phifer-Rixey, M.**, Taylor, G.M. and J. Christner. 2007. Genetic heterogeneity among intertidal habitats in the flat periwinkle, *Littorina obtusata*. *Molecular Ecology* 16(11):2393-2404.

PRESENTATIONS (2016-PRESENT)

- Phifer-Rixey, M.**, *et al.* House Mice and Changing Environments (*invited, virtual*). Ohio University, October 2022.
- Phifer-Rixey, M.**, *et al.* Diet induced plasticity in body size among wild derived house mice from the Americas (*poster*). Population, Evolutionary, and Quantitative Genetics, Genetics Society of America, Asilomar, CA, June 2022.
- Phifer-Rixey, M.**, *et al.* Evolutionary genetics in wild house mice (*invited, virtual*). Fordham University, February 2022.
- Phifer-Rixey, M.**, *et al.* Evolutionary genetics in wild house mice (*invited, virtual*). Drexel University, February 2022.

- Phifer-Rixey, M., et al.** Evolutionary genetics in wild house mice (*invited, virtual*). Systems Neuroecology Seminar Series. Princeton University, April 2021.
- Phifer-Rixey, M., et al.** Environmental Adaptation in House Mice from the Americas. Society for Molecular Biology and Evolution. Québec City, Canada. June 2020 (*anceled COVID-19*).
- Phifer-Rixey, M., et al.** Environmental Adaptation in House Mice from the Americas. The Allied Genetics Conference, Washington, DC, April 2020 (*new faculty travel award, in person canceled*).
- Phifer-Rixey, M., et al.** Evolutionary genetics in house mice (*invited*). Farleigh-Dickinson University, NJ, March 2020 (*anceled COVID-19*).
- Phifer-Rixey, M., et al.** The genomics of environmental adaptation in house mice (*invited*). University of Georgia, Athens, GA, January 2020.
- Phifer-Rixey, M., et al.** Genetics in the Wild (*invited*). National Association of Biology Teachers, Chicago, IL, November 2019.
- Phifer-Rixey, M., et al.** The genomics of environmental adaptation in house mice (*oral*). Evolution Meeting, Providence, RI, June 2019.
- Phifer-Rixey, M., et al.** Environmental adaptation in house mice (*invited*). William and Mary, Williamsburg, VA, November 2018.
- Phifer-Rixey, M., et al.** The genetics of environmental adaptation: house mice in the Americas (*poster*). Population, Evolutionary, and Quantitative Genetics, Genetics Society of America, Madison, WI, May 2018.
- Phifer-Rixey, M., et al.** Recent environmental adaptation in an invasive species: house mice in the Americas (*oral, selected from abstracts*). European Society for Evolutionary Biology, Groningen, The Netherlands, August 2017.
- Phifer-Rixey, M., et al.** The genetic basis of environmental adaptation in house mice (*poster*). Society for the Study of Evolution, Portland, OR, June 2017.
- Phifer-Rixey, M., et al.** Evolutionary genomics in house mice (*invited*). Rutgers University, Camden, NJ, April 2017.
- Phifer-Rixey, M., et al.** Evolutionary genomics in house mice (*invited*). University of Pennsylvania, PA, October 2016.
- Phifer-Rixey, M., et al.** The genetic basis of environmental adaptation in house mice (*oral, selected from abstracts*). The Allied Genetics Conference, Orlando, FL, July 2016.
- Phifer-Rixey, M., et al.** The genetic basis of environmental adaptation in house mice (*oral*). Evolution, Austin, TX, June 2016.

SERVICE AND OUTREACH

Service to the Field

Manuscript Review (2016-present): American Naturalist (2021), Biology Letters (2018), Evolutionary Applications (2019, 2020), Ecology and Evolution (2022); G3: Genes, Genomes, Genetics (2020), Genetics (2018, 2019), Genome Biology and Evolution (2019,2020), Heredity (2018, 2019, 2020), Molecular Ecology (2018, 2019, 2022), Nature Communications (2020), Nature Ecology and Evolution (2022), Oecologia (2019), PLoS Genetics (2017), PLoS One (2017), Proceedings of the Royal Society B (2021), Royal Society Open Science (2021), Science Advances (2019), Scientific Data (2016), and Scientific Reports (2016, 2017).

Proposal Review (2016-present): National Science Foundation (*ad hoc*/other: 2016, 2019, 2021; panel 2021, 2022), Czech Science Foundation (*ad hoc*, 2018, 2019, 2020); German Research Foundation (2022); French National Research Agency (2022).

NSF RCN Evolving Seas, Diversity Committee Member, Summer 2020-present.
iBiology. Teaching resource review. Fall 2020, Spring 2021.

Service to Monmouth University

IACUC leave replacement, Spring 2021. Full committee member, Fall 2021-Spring 2022.

Grants & Sabbaticals Committee, 2018-present; co-Chair, Fall 2020-Spring 2022.

School of Science Scholarship Committee. Fall 2019-present.

Vivarium Users Group. Spring 2019-present; Chair, Spring 2019-Spring 2020.

Outreach/Public Engagement:

eDNA in our Coastal Waters. Long Branch Public High School. Spring 2022.

With Dr. Keith Dunton, Dr. Jason Adolf, and student Cameron Gaines, I developed a two-day eDNA lab for two classes of environmental science students at Long Branch High School. Students learned key skills (PCR, gel electrophoresis) in the context of using eDNA to learn about our coastal communities and had an opportunity to interact with local scientists. With funding from the Achelis-Bodman Foundation, we were also able to provide equipment for the teachers to use in future labs.

Genetics, Genomics, and Racism: How Science Shapes Policy Past, Present, Future. Spring 2021. With Dr. Jennifer McGovern (Sociology) & student Cameron Gaines (Bio/Soc major), I proposed and organized an interdisciplinary program with the goal of confronting the legacy of past genetic technologies and the future impacts of new genomic initiatives. We invited two emerging leaders, one from Sociology (Gabriela Corona Valencia) and one from Genetics (Krystal Tsoie), to discuss their work in a joint class session and a virtual panel event for the public. We also integrated classroom readings, and assignments to help students engage with the issues fully. This program was funded through a competitive pilot Diversity Innovation Grant from the Office of the Provost and the Intercultural Center.

<https://www.monmouth.edu/news/panel-genetics-genomics-and-racism-april-8/>

NSF Beacon Teacher Revolution, Summer 2018, Summer 2019. I hosted a local high school biology teacher in 2018 and 2019. The goal of the program is to provide a path for high school teachers to integrate research in their classroom activities. NSF Beacon provides a stipend and research funds for the teacher. In addition, both teachers were provided funding to present at national conferences and Dr. Phifer-Rixey was invited to give a seminar at the National Association of Biology Teachers in 2019. <https://www.monmouth.edu/news/professor-phifer-rixey-and-alumna-present-at-national-conference-for-biology-teachers/> <http://datanuggets.org/2019/12/fishy-origins/>

DNA Unraveled, Fall 2017-Fall 2019. With my students, I developed and ran a workshop on DNA for regional public schools. We secured funding through the European Society for Evolutionary Biology and have delivered the interactive workshop to >500 students with the help of ~50 undergraduate volunteers. Local participating teachers were provided with kits to repeat the workshop at low cost in the future. <https://www.monmouth.edu/news/monmouth-u-students-partner-with-local-elementary-schools-to-unravel-dna/>

Commentary: Undark Magazine; Society for the Study of Evolution New Faculty Profile; Science News

Judge/Volunteer: Wayside Elementary Science Fair, Spring 2017; William Paterson Undergraduate Research Symposium, Spring 2018; Evolution in Philadelphia, 2017

UNDERGRADUATE MENTORING

Monmouth University

I mentored 24 undergraduates through independent study, research courses, student lab assistant positions, and summer research programs (Fall of 2016-Fall 2022). In addition, I co-mentored five students in partnership with a statistical consulting course.

Student Funding and Awards:

Jesse Bragger, Jane Freed Honor's Thesis Award Finalist, Spring 2021; Tri Beta Chi Eta Award for Service and Excellence in Research and Academics, Spring 2021.

Emily Tumbaco, Lorena Mancino, Statistical analysis of diet and location impact on house mouse growth, Dean's Award for Excellence in Undergraduate Research mentored with Dr. Richard Bastian and Dr. David Darmon.

Erin Oscar, Monmouth University Summer Scholar 2021.

Tiffany Longo, Tri Beta Chi Eta Award for Service and Excellence in Research and Academics, 2020; Biology Department Travel Grant 2018-2019; Tri Beta Research Award (external), \$750, 2018-2019; Monmouth University Summer Scholar 2017.

David Grossi, Tri Beta Chi Eta Award for Service and Excellence in Research and Academics, 2020.

Sean Kuback, Biology Department Transfer Student Award for Academic Excellence and Research, 2020.

Sebastian Vera, Society for the Study of Evolution Undergraduate Diversity Travel Grant 2019; Monmouth University Summer Scholar 2018. Monmouth University.

External Student Presentations/Publications (undergraduate researchers in **bold**):

Santangelo James S., **Bragger Jesse R.**,, **Longo Tiffany C.**,..... **Shaheed Summer A.**, Zytynska Sharon E., and Johnson Marc T. J. 2022. Global urban environmental change drives adaptation in white clover. *Science* 375:1275–1281.

Caroline Reverendo, Tiffany Longo, Megan Phifer-Rixey. Variation in traits related to reproduction in new strains of wild-derived mice. *Society for the Study of Evolution (virtual, oral)*, June 2021.

Tiffany Longo, Mallory Ballinger, Kristi McDonald, Michael Nachman, Megan Phifer-Rixey. Variation in reproductive traits among house mice adapted to different climates in the Americas (*virtual poster*). TAGC, GSA, April 2020.

Tiffany Longo, Jesse Bragger, David Grossi, Mallory Ballinger, Michael Nachman, Megan Phifer-Rixey. Variation in reproductive traits among house mice adapted to different climates in the Americas (*poster*). MACUB. West Long Branch, NJ, October 2019.

Tiffany Longo, Jesse Bragger, Mallory Ballinger, Michael Nachman, Megan Phifer-Rixey. Variation in reproductive traits among house mice adapted to different climates in the Americas (*poster*). *Society for the Study of Evolution*, Providence, RI, June 2019.

Sebastian Vera, Summer Shaheed, Tiffany Longo, Megan Phifer-Rixey. The effects of diet on aspects of body size in mice from different climates (*poster*). Society for the Study of Evolution, Providence, RI, June 2019.

Tiffany Longo, Jesse Bragger, Mallory Ballinger, Michael Nachman, Megan Phifer-Rixey. Variation in reproductive traits among house mice adapted to different climates in the Americas (*poster*). William Paterson Undergraduate Research Symposium (WPURS), Paterson, NJ. April 2019.

Tiffany Longo, Summer Shaheed, Sebastian Vera, Mallory Ballinger, Michael Nachman, Megan Phifer-Rixey. Variation in reproductive traits among house mice adapted to different climates in the Americas (*poster*). Evolution in Philadelphia Conference. September 2018.

Nikole Andre, Carleigh Engstrom, **Anjali Tampy,** John Tiedemann, Megan Phifer-Rixey. Using microsatellite genotyping to characterize migration patterns in Striped Bass (*poster*). Evolution in Philadelphia Conference. September 2018.

Tiffany Longo, Mallory Ballinger, Michael Nachman, Megan Phifer-Rixey. Variation in reproductive traits among house mice adapted to different climates in the Americas (*poster*). WPURS, Paterson, NJ. April 2018.

Brian Reiss, Keith Dunton, Megan Phifer-Rixey. DNA extraction from Atlantic Sturgeon spine and fin tissue (*poster*). WPURS, Paterson, NJ. April 2018.

Sebastian Vera, Megan Phifer-Rixey. Identifying pathways with signals of global regulation linked to environmental adaptation in house mice (*poster*). WPURS, April 2018.

PROFESSIONAL MEMBERSHIPS

European Society of Evolutionary Biology, Genetics Society of America, Society for Molecular Biology and Evolution, Society for the Study of Evolution

COLLABORATION AND EXTERNAL PROFESSIONAL DEVELOPMENT

Urban Omics Workshop, Society for Molecular Biology and Evolution, Washington, DC, November 2022.

Building collaborations to investigate urban eco-evolutionary dynamics across the LTER network, Albuquerque, NM, August 2022.

Difference, not deficit: Reframing the conversation around genetics, deafness, and disability. pgED webinar, May 2022.

The Evolution Meeting (Education Symposium and iEvoBio, virtual), June 2021.

Biology of Genomes Conference (virtual CHSL), Spring 2021.

American Society of Naturalists Meeting (virtual Asilomar). Spring 2021.

Discussing Genetics: History of Eugenics Workshop Webinar. PgEd and Genetics Society of America. Spring 2021.

Pedagogy of a Pandemic. Undergraduate Genetics Education Workshop Webinar. Palm Network. Spring 2021.

TAGC 2020 Virtual Education Workshops. Genetics Society of America. Spring 2020.

Raising a Woke Generation of Geneticists: how and why to include eugenics history in genetics classes; BREW Bridging Research and Education workshop.

McKusick Short Course (virtual), Jackson Labs, 2020

MARACOOS (Mid-Atlantic IOOS) partner. Powering Understanding and Prediction of the Mid-Atlantic Ocean, Coasts, and Estuaries. 2020.

Synthesis Workshop for the Evolution in Changing Seas. NSF RCN, August 2019

Avida-ED Active LENS educator workshop (NSF funded), Austin, TX, June 2019

NY Area Population Genomics Workshop, NYC, NY January 2019.

Bilateral eDNA workshop, Woods Hole, MA, April 2018.

Undergraduate Teaching Workshop, Society for the Study of Evolution Meeting, June 2017