

PHILLIP LUKE DAVIDSON

e-mail: phillip.davidson@msstate.edu
website: davidsonlab-msu.github.io
phone: (662) 325-4803

Department of Biological Sciences
Mississippi State University
Starkville, MS 39759

POSITIONS

2025-pres.	Assistant Professor Department of Biological Sciences	Mississippi State University
2021-2025	Postdoctoral Associate Department of Biology	Indiana University
2016-2021	Graduate Research Assistant Department of Biology	Duke University
2013-2016	Research Assistant Department of Biology	University of Miami

EDUCATION

2016-2021	Doctor of Philosophy, Biology	Duke University
2013-2016	Bachelor of Science, Biology	University of Miami

PUBLICATIONS

- In review **Davidson, PL**, Manley, IM, Moczek, AP. Modularity of gene regulatory networks enables rapid diversification of an evolutionary novelty in horned beetles.
- 2026 Nadolski EM, Choi, Y, Jones, JA, Moczek, AP, **Davidson, PL**. Chromosome-level sex-specific genome assemblies of *Onthophagus binodis* provide insight into scarab sex chromosomes. *Genome Biology & Evolution*. 18:evag023. [Link](#)
- 2025 Nadolski, EM, **Davidson, PL**, Jones, JA, Westwick, RR, Moczek, AP. Insects in their environments: eco-devo and evo-devo perspectives. In *Comprehensive Molecular Insect Science* (2nd Ed.)
- 2024 **Davidson, PL**, Moczek, AP. Genome evolution and divergence in *cis*-regulatory architecture is associated with condition-responsive development in horned dung beetles. *PLoS Genetics*. 20(3): e1011165. [Link](#)
- Harry CJ*, Hibshman JD*, Damatac A, **Davidson PL**, Estermann MA, Flores-Flores M, Holmes CM, Lázaro J, Legere EA, Leyhr J, Thendral SB, Vincent BA, Goldstein B. Protocol for fluorescent live-cell staining of tardigrades. *STAR Protocols* 5:103232. [Link](#)
- 2023 **Davidson, PL***, Nadolski, EM*, Moczek, AP. Gene regulatory networks underlying the development and evolution of plasticity in horned beetles. *Current Opinion in Insect Science*. 60:101114. [Link](#)

- Devens, HR, Davidson, PL, Byrne, M, Wray, GA. Hybrid epigenomes reveal extensive local genetic changes to chromatin accessibility that contribute to divergence in embryonic gene expression between species. *Molecular Biology & Evolution*. 40:msad222. [Link](#)
- Davidson, PL, Lessios, HA, Wray, GA, McMillan, WO, Prada, C. High quality genome assembly of the sea urchin *Echinometra lucunter*, a model for speciation in the sea. *Genome Biology & Evolution*. 15:evad093. [Link](#)
- 2022 Davidson, PL, Guo, H, Swart, JS, Massri, AJ, Edgar, A, Wang, L, Berrio, A, Devens, HR, Zhang, H, Chang, Y, Byrne, M, Fan, G, Wray, GA. Recent reconfiguration of an ancient developmental gene regulatory network in *Heliocidaris* sea urchins. *Nature Ecology & Evolution*. 6:1907–1920. [Link](#)
- Davidson, PL, Byrne, M, Wray, GA. Evolutionary changes in the chromatin landscape contribute to reorganization of a developmental gene regulatory network during rapid life history divergence in sea urchins. *Molecular Biology & Evolution*. 39:msac172. [Link](#)
- Ketchum, RN, Davidson, PL, Smith EG, Wray, GA, Burt, JA, Ryan, JF, Reitzel, AM. Chromosome-level genome assembly of the highly heterozygous sea urchin *Echinometra* sp. EZ. *Genome Biology & Evolution*. 14:evac144. [Link](#)
- 2021 Song, H*, Guo*, X*, Sun, L*, Wang, Q*, Han, F, Wang, H, Wray, GA, Davidson, PL, Wang, Q, Hu, Z, Zhou, C, Yu, Z, Yang, M, Feng, J, Shi, P, Zhou, Y, Zhang, L, Zhang, T. Hard clam genome reveals massive expansion and diversification of inhibitors of apoptosis underlying stress adaptation. *BMC Biology*. 19,15. [Link](#)
- Byrne, M, Koop, D, Strbenac, D, Cisternas, P, Yang, JWH, Davidson, PL, Wray, GA. Transcriptomic analysis of Nodal- and BMP-associated genes during development to the juvenile sea star in *Parvulastra exigua* (Asterinidae). *Marine Genomics*. 59:100857. [Link](#)
- 2020 Davidson, PL*, Guo, H*, Wang, L, Berrio, A, Zhang, H, Chang, Y, Soborowski, AL, McClay, DR, Fan, G, Wray, GA. Chromosomal-Level genome assembly of the sea urchin *Lytechinus variegatus* substantially improves functional genomic analyses. *Genome Biology & Evolution*. 12:1080–1086. [Link](#)
- Davidson, PL*, Devens, HR*, Deaker, DJ, Smith, KE, Wray, GA, Byrne, M. Ocean acidification induces distinct transcriptomic responses across life history stages of the sea urchin *Heliocidaris erythrogramma*. *Molecular Ecology*. 29: 4618-4636. [Link](#)
- Byrne, M, Koop, D, Strbenac, D, Cisternas, Paula, Balogh, R, Yang, JYH, Davidson, PL, Wray, GA. Transcriptomic analysis of sea star development through metamorphosis to the highly derived pentamerous body plan with a focus on neural transcription factors. *DNA Research*. 27: dsaa007. [Link](#)
- 2019 Davidson, PL, Thompson, JW, Foster, MW, Moseley, MA, Byrne, M, Wray, GA. A comparative analysis of egg provisioning using mass spectrometry during rapid life history evolution in sea urchins. *Evolution & Development*. 21:188-204. [Link](#)

- 2017 **Davidson, PL**, Koch, BJ, Schnitzler, CE, Henry, JQ, Martindale, MQ, Baxevanis, AD, Browne, WE. The maternal-zygotic transition and zygotic activation of *Mnemiopsis leidyi* genome occurs within the first three cell cycles. *Molecular Reproduction & Development*. 84:1218-1229. (Cover feature) [Link](#)
*equal contribution

GRANTS & FUNDING

2022-2024 NSF Postdoctoral Fellowship in Biology \$138,000

AWARDS

2019,2022	Developmental Biology of the Sea Urchin Travel Award	sum: \$1,300
2019	Duke University Graduate Travel Award	\$500
2018	Duke Biology Grant-in-Aid Award	\$1,000
2015	U of Miami Institute for Data Science and Computing Fellowship	\$500
2015	Beyond the Book Summer Research Scholarship	\$4,000
2013-2016	President's Scholarship, Gables Scholarship, Foote Fellowship	NA

TEACHING

Instructor

2026	Evolutionary and Developmental Biology	Mississippi State University
2019	Marine Research in the Gulf of Mexico	Duke TIP

Teaching Assistant

2020	Molecular Biology, Lab (3 sections)	Duke University
2019	Genetics and Evolution, Lab (2 sections)	Duke University
2015	Introduction to Marine Biology, Lecture	University of Miami

Guest Lecturer

2022	Introduction to Differential Gene Expression in R	Indiana University
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PRESENTATIONS

2025	Mississippi Association of Entomologists, Nematologists, & Plant Pathologists (MAENPP) Mississippi State University, Starkville, MS, USA	Speaker
	Pan-Am Society for Evolutionary Developmental Biology University of Miami, Coral Gables, FL, USA <i>Best Postdoctoral Presentation (2nd Place)</i>	Speaker
	Evolution University of Georgia, Athens, GA, USA	Speaker
2024	European Society for Evolutionary Developmental Biology University of Helsinki, Helsinki, Finland	Speaker
	Biological Sciences Departmental Seminar Mississippi State University, Starkville, MS, USA	Speaker
	Biological Sciences Departmental Seminar Florida State University, Tallahassee, FL, USA	Speaker
2023	Ecology and Evolutionary Biology Brown Bag Seminar	Speaker

	Indiana University, Bloomington, IN, USA	
	Embryology 130th Anniversary Symposium	Poster
	Marine Biological Laboratory, Woods Hole, MA, USA	
	Ecology and Evolutionary Biology Departmental Seminar	Speaker
	University of Kansas, Lawrence, KS, USA	
2022	Evolution and Core Processes in Gene Expression	Speaker
	Stower's Institute, Kansas City, KS, USA	
	Evolution of Networks in Changing Worlds (Symposium)	Speaker
	University College London, London, UK	
	Developmental Biology of the Sea Urchin XXVI	Speaker
	Marine Biological Laboratory, Woods Hole, MA, USA	
2021	Ecology and Evolutionary Biology Brown Bag Seminar	Speaker
	Indiana University, Bloomington, IN, USA	
2019	Pan-Am Society for Evolutionary Developmental Biology	Poster
	University of Miami, Coral Gables, FL, USA	
2018	Developmental Biology of the Sea Urchin XXV	Speaker
	Marine Biological Laboratory, Woods Hole, MA, USA	
	Developmental and Stem Cell Biology Seminar Series	Speaker
	University of North Carolina, Chapel Hill, NC, USA	
2016	Undergraduate Research, Creativity, and Innovation Forum	Poster
	University of Miami, Coral Gables, FL, USA	

PEER REVIEW

Funding agencies

2025, 2026	Deutsche Forschungsgemeinschaft (DFG)
2025	National Science Foundation: Integrative Organismal Biology

Journals

<i>EMBO</i>	<i>Molecular Biology & Evolution</i>
<i>Evolution & Development</i>	<i>Molecular Ecology Resources</i>
<i>Genome Biology & Evolution</i>	<i>Nucleic Acids Research</i>
<i>Genome Research</i>	<i>Scientific Reports</i>
<i>GIGA</i>	
<i>Gigabyte</i>	
<i>Journal of Heredity</i>	

SOCIETY MEMBERSHIPS

Society for Developmental Biology (SDB)
 Society for the Study of Evolution (SSE)
 Pan-American Society for Evolutionary-Developmental Biology (PASEDB)

PROFESSIONAL DEVELOPMENT

2026 New Faculty Teaching Academy – Mississippi State University

- 2025 New Faculty Mentorship Program – Mississippi State University
 2023 Marine Biological Laboratory Embryology Course (3 weeks)
 2022 Translating Science: Connecting the Next Generation Scientist with K12 Educators

MENTORSHIP

- 2026-pres. Dylan Dukes, Undergraduate Research Assistant, Mississippi State University
 2026-pres. Lauren Lee, Undergraduate Research Assistant, Mississippi State University
 2023-2025 Isabel Manley, Undergraduate, Indiana University: Honor’s Thesis
“Function and evolution of BMP signaling in beetle horn development and diversification”
 2022 Suki Gill, Undergraduate, Indiana University: GROUPEs Research Scholar
“Evolution of the Hox gene cluster in Coleoptera”

OUTREACH AND SERVICE

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| 2025-2026 | Faculty Job Search Committee Member
Department of Biological Sciences | Miss. St. University |
| 2022, 2024 | Bug Fest Educator
Science event for local community focused on insect education. | Bloomington, IN |
| 2022 | IU GROUPEs Scholars Program
Intensive summer-long DEI program for 1st generation and underrepresented incoming college students. Mentored research project on “Hox gene evolution in Coleoptera”. | Indiana University |
| 2021-2024 | Moczek Lab Outreach Initiative
Teaching and developing science education modules for local high schools. | Bloomington, IN |
| 2021 | Science Fest Educator
Local science education event for K-12 | Indiana University |
| 2017-2018 | Co-Chair, Duke Biology Graduate Steering Committee | Duke University |
| 2015-2016 | UConnect Research Mentor
Peer-mentor program for increasing accessibility of undergraduate research opportunities | University of Miami |