

# PHILLIP LUKE DAVIDSON

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Department of Biology  
Indiana University  
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## EDUCATION

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

## POSITIONS

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2022-present	NSF Postdoctoral Fellow in Biology	Indiana University
2021-2022	Postdoctoral Associate	Indiana University
2013-2016	Research Associate	University of Miami

## PUBLICATIONS

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- 2024 **Davidson, PL**, Moczek, AP. Genome evolution and divergence in *cis*-regulatory architecture underlie condition-responsive development in horned dung beetles. *PLoS Genetics*. *In press*.
- 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, Baxeavanis, 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

## FELLOWSHIPS AND AWARDS

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

<b>Instructor</b>		
2019	Marine Research in the Gulf of Mexico, Field Course	Duke TIP
<b>Teaching Assistant</b>		
2020	Molecular Biology, Lab (3 sections)	Duke University

2019	Genetics and Evolution, Lab (2 sections)	Duke University
2015	Introduction to Marine Biology, Lecture and Lab	University of Miami
<b>Guest Lecturer</b>		
2022	Introduction to Differential Gene Expression in R	Indiana University

## PRESENTATIONS

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2023	<b>Ecology and Evolutionary Biology Brown Bag Seminar</b> Indiana University, Bloomington, IN, USA	Invited Speaker
	<b>Embryology 130<sup>th</sup> Anniversary Symposium</b> Marine Biological Laboratory, Woods Hole, MA, USA	Poster
	<b>Ecology and Evolutionary Biology Departmental Seminar</b> University of Kansas, Lawrence, KS, USA	Invited Speaker
2022	<b>Evolution and Core Processes in Gene Expression</b> Stower's Institute, Kansas City, KS, USA	Invited Speaker
	<b>Evolution of Networks in Changing Worlds (Symposium)</b> University College London, London, UK	Invited Speaker
	<b>Developmental Biology of the Sea Urchin XXVI</b> Marine Biological Laboratory, Woods Hole, MA, USA	Invited Speaker
2021	<b>Ecology and Evolutionary Biology Brown Bag Seminar</b> Indiana University, Bloomington, IN, USA	Invited Speaker
2019	<b>Pan-Am Society for Evolutionary Developmental Biology</b> University of Miami, Coral Gables, FL, USA	Poster
2018	<b>Developmental Biology of the Sea Urchin XXV</b> Marine Biological Laboratory, Woods Hole, MA, USA	Invited Speaker
	<b>Developmental and Stem Cell Biology Seminar Series</b> University of North Carolina, Chapel Hill, NC, USA	Invited Speaker
2016	<b>Undergraduate Research, Creativity, and Innovation Forum</b> University of Miami, Coral Gables, FL, USA	Poster

## SOCIETY MEMBERSHIPS

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

## PROFESSIONAL DEVELOPMENT

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2023	Marine Biological Laboratory Embryology Course (3 weeks)
2022	Translating Science: Connecting the Next Generation Scientist with K12 Educators

## MENTORSHIP

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- 2023-pres. 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: GROUPs Research Scholar  
*"Evolution of the Hox gene cluster in Coleoptera"*

## OUTREACH AND SERVICE

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| 2022       | <b>Bug Fest Educator</b><br>Science event for local community focused on insect education.   | Bloomington, IN  |
| 2022       | <b>IU GROUPs Scholars Program</b><br>Intensive summer-long DEI program for 1st generation and underrepresented incoming college students. Mentored research project on "Hox gene evolution in Coleoptera". | Bloomington, IN  |
| 2021-pres. | <b>Moczek Lab Outreach Initiative</b><br>Teaching and developing science education modules for local high schools.   | Bloomington, IN  |
| 2021       | <b>Science Fest Educator</b><br>Local science education event for K-12   | Bloomington, IN  |
| 2017-2018  | <b>Co-Chair, Duke Biology Graduate Steering Committee</b>  | Durham, NC       |
| 2015-2016  | <b>UConnect Research Mentor</b><br>Peer-mentor program for increasing accessibility of undergraduate research opportunities  | Coral Gables, FL |

## REFERENCES

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|---------------------|---------------------------|----------------------|
| Armin Moczek, Ph.D. | armin@indiana.edu         | Postdoctoral Advisor |
| Greg Wray, Ph.D.    | gwwray@duke.edu           | Doctoral Adviser     |
| Maria Byrne, Ph.D.  | maria.byrne@sydney.edu.au | Collaborator         |