

ABIGAIL M. HAYES

CONTACT & AFFILIATION

Department of Ecology and Evolutionary Biology
75 N. Eagleville Road, Unit 3043
Storrs, CT 06269-3043, USA

Twitter: @ArthropodAbbey
Email: abigailhayesPhD@gmail.com
Phone: 1 (916) 844 9188

CURRENT POSITION

2021–23 National Science Foundation (NSF) Postdoctoral Research Fellow in Biology
Department of Ecology and Evolutionary Biology, University of Connecticut
Postdoctoral Sponsor: Elizabeth Jockusch

EDUCATION

2021 Ph.D. in Entomology, Washington State University, Pullman, WA, USA
Dissertation: Morph formation, environmental cues and transduction mechanisms in the wing polyphenic sand cricket: *Gryllus firmus*
Major Advisor: Dr. Laura Lavine

2016 B.S. in Biology, Saint Mary's College of California, Moraga, CA, USA

RELEVANT WORK EXPERIENCES

2021–2023 NSF Postdoctoral Fellow - University of Connecticut - Jockusch Lab
Evaluating the expression and function of certain candidate genes in wing and bi-layered epithelial structures to assess evolutionary homology

2016–2021 Graduate Research / Teaching Assistant - Washington State University - Lavine Lab
Research on *Gryllus firmus* and *Trypoxylus dichotomus* utilizing RNAi to evaluate the effect of certain cell signaling pathways on plasticity of exaggerated traits

2015–2016 Undergraduate Researcher - Saint Mary's College of California - Marchetti Lab
Collection, identification, and analyses via stable isotopes performed on aquatic macroinvertebrates and amphibians; Sea Turtle abundance surveys

2014–2017 Clinician - Lindamood-Bell Learning Processes
Over two years of teaching two programs aimed at decoding and processing of language by special needs individuals, with 80+ hours of training

PUBLICATIONS

* Indicates undergraduate co-author

In preparation

2. **Hayes, A.**, Worthington, A.M; Lavine, M; Lavine L. The Paradox of Wing Polyphenic Development in Crickets. Submitting to *Evolution* by 03-15-23, MS available upon request
1. **Hayes, A.**, Griffith, K*.; Lavine, M; Lavine L. Consequences of Morph Formation in the Wing Polyphenic Sand Cricket, *G. firmus.*; MS available upon request

Published

7. Smith, O.M., Jocson, D., Lee, B.W., **Hayes, A.** ... & Crowder, D.W. [16 authors total], 2022. Identifying Farming Strategies Associated with Achieving Global Agricultural Sustainability. *Frontiers in Sustainable Food Systems* 6:882503
<https://doi.org/10.3389/fsufs.2022.882503>
6. **Hayes, A.** 2021 Wing Polyphenism in *Gryllus firmus*. *Metalpea* 41(2):9–10
<https://orthsoc.org/publications/metalepta/>
5. Lee, B.W., **Hayes, A.**, Cohen, A., Marshall, A., Asche, M. 2020. Synergisms in Science: Climate Change and Integrated Pest Management Through the Lens of Communication - 2019 Student Debates. *Journal of Insect Science* 20:5
<https://doi.org/10.1093/jisesa/ieaa077>
4. Marchetti, M. P. and **Hayes, A.*** 2020. Life History Variation in Two Populations of California Newt, *Taricha torosa*, *Western North American Naturalist* 80(2):165–174
<https://doi.org/10.3398/064.080.0204>
3. Lavine, M.D., Gotoh, H., **Hayes, A.**, Lavine, L. 2019. The Insulin Signaling Substrate Chico and the Ecdysone Response Element Broad Both Regulate Growth of the Head Horns in the Asian Rhinoceros Beetle, *Trypoxylus Dichotomus*. *Integrative and Comparative Biology* 59(5):1338–1345
<https://doi.org/10.1093/icb/icz093>
2. **Hayes, A.**, Lavine, M.D., Gotoh, H., Lin, X., Lavine, L. 2019. Mechanisms Regulating Phenotypic Plasticity in Wing Polyphenic Insects. *Advances in Insect Physiology* 56:43–72
<https://doi.org/10.1016/bs.aiip.2019.01.005>
1. Adesanya, A., Lee, B.W., Cohen, A., **Hayes, A.**, Hepler, J., Marshall, A. 2019. Student Debates: The Anthropocene: Implications for Arthropods and Biodiversity: Habitat Loss Via Land-Use Change. *American Entomologist* 65(1):50–60
<https://doi.org/10.1093/ae/tmz001>

FELLOWSHIPS

- 2021–23 National Science Foundation (NSF) Postdoctoral Research Fellow in Biology - **\$138,000**
Broadening Participation of Groups Underrepresented in Biology (DBI 2109706),
Developmental patterning of double-layered epithelia and the evolutionary origin of
insect wings

AWARDS AND FUNDING

- 2020 Washington State University (WSU) Entomology Dept. Research Scholarship - \$3,500
2020 WSU CAHNRS – 3 Minute Thesis Competition – Third place
Watch: <https://youtu.be/pCbjhQOAvG4>
2020 WSU Entomology Department – 3 Minute Thesis Competition – finalist - \$100
2019 Pacific Branch of the Entomological Society of America Elevator Talk – 1st place
2019 WSU Entomology Department Travel Scholarship – \$1,613
2019 WSU Entomology Department Research Scholarship - \$1,082
2019 Orthopterists' Society Theodore J. Cohn Research Fund - \$1,500
2018 Entomology Graduate Student Association Mini Grant - \$300
2018 Entomological Society of America Linnean Games Travel Funding - \$200
2016–17 WSU STEM Recruitment Scholarship
2016 Student Symposium Presentation, Western Division of American
Fisheries Society – 3rd place
2015 St Mary's College of California Mal and Sylvia Boyce Research Scholarship
2013–15 Dean's List, Saint Mary's College of California
2012 Honors at Entrance Scholarship, Saint Mary's College of California
2012 Presidential Scholarship, Saint Mary's College of California

PROFESSIONAL PRESENTATIONS

INVITED TALKS

- 2022 **Hayes, A.**, Griffin, K., Lavine, M., Lavine, L. - **Entomological Society of America, Vancouver, BC, Canada** - Symposium: Phenotypic Plasticity in Insects as Experienced Through Art, Science, and Culture
Consequences of Morph Formation in the Wing Polyphenic Sand Cricket, *Gryllus firmus*
- 2022 **Hayes, A.** - **University of Connecticut** - Department of Ecology and Evolutionary Biology Seminar
To Fly or Not to Fly: Wing Polyphenic Development in the Sand Cricket *Gryllus firmus*.
- 2022 **Hayes, A.** - **Iowa State University** - Entomology Department Seminar
To Fly or Not to Fly: Wing Polyphenic Development in *Gryllus firmus*.

- 2021 **Hayes, A. - Washington State University** - Entomology Department Seminar
Morph Formation, Environmental Cues, and Transduction Mechanisms in the Wing
Polyphenic Sand Cricket: *Gryllus firmus*
- 2020 **Hayes, A. - Entomological Society of America, Virtual/Orlando, FL Meeting** -
Symposium: e-Entomology: Inclusive Outreach in a Digital World
Creating Inclusive Online Outreach
Watch here: <https://youtu.be/rQ7ni0Up0xA>
- 2019 **Hayes, A., Lavine, L. - Entomological Society of America , St Louis, MO** -
Symposium: Orthopterists' Society Meeting
Morph Formation in the Wing Polyphenic Sand Cricket

CONTRIBUTED TALKS

- 2022 **Hayes, A., Worthington, A., Lavine, M., Lavine L. - Entomological Society of America - Vancouver, BC, Canada** - Stay and Lay or Fly Away? Development in the Wing Polyphenic Sand Cricket, *Gryllus firmus*
- 2016 **Hayes A., Marchetti, M.P. - Western Division of the American Fisheries Society - Reno, NV**
Food Web Ecology of the California Newt, *Taricha torosa*

POSTERS

- 2019 **Hayes, A., Lavine, M., Gotoh, H., Lavine, L. - Entomological Society of America – St Louis, MO**
Ecdysone and Insulin Signaling Pathways Mediate Exaggerated Trait Growth in the Japanese Rhinoceros Beetle, *Trypoxylus dichotomus*.
- 2019 **Hayes, A., Lavine, L. - Pacific Branch of the Entomological Society of America – San Diego, CA**
Longitudinal Ontogenetic Allometry of the Sand Cricket, *Gryllus firmus*.
- 2015 **Hayes A., Marchetti M.P. - St Mary's College Poster Session – Moraga, CA**
Food Web Ecology of the Coast Range Newt, *Taricha torosa*

TEACHING EXPERIENCE

As Instructor of Record or significant contributions to course design and implementation

- 2021–2023 Progressive commitment LEAP - PNB 3895 (4 semesters)
- 2020–2021 Discover Insects: Laboratory for Non-Science majors - Entomology 103–
synchronous virtual course (2 summers)
- 2017–2018 Discover Insects: Laboratory for Non-Science majors - Entomology 103 (2
semesters)

As Teaching Assistant

2021	General Entomology - Entomology 343 (1 semester)
2020	Taxonomic Entomology - Entomology 539 (1 semester)
2019	Ecological and Integrated Pest Management - Entomology 351 (1 semester)
2019	Pesticides and the Environment - Integrated Pest Management 452/552 (1 semester)
2016	Discover Insects: Laboratory for Non-Science majors (volunteer Teaching Assistant, 1 semester)

Course Descriptions

University of Connecticut – PNB 3895 – LEAP – **L**earning through **E**xperiencing and **A**pplying **P**inciples – A four semester progressive commitment course aimed at giving first year freshman from underrepresented backgrounds in the biological sciences a LEAP into research. From learning gene theory in a one-unit course their first semester to completing bench work looking at the function and expression of novel genes across animal taxa in the four-unit fourth semester course. Course design, lecturing and implementation.

Discover Insects: A Laboratory Course for Non-Science Majors - Entomology 103) Washington State University – 25 students as TA; ~275 students as **instructor of record** 2016, 2017, 2018, Summer 2020 (virtual), Summer 2021 (virtual) – includes course design and transition to virtual teaching in COVID-19 pandemic

Washington State University - Entomology 343 – General Entomology; 40 students as lecture TA - 2021

Washington State University – Entomology 539 – Taxonomic Entomology – 20 graduate students as lecture and lab TA, 4 lectures delivered - 2020

Washington State University - Entomology 351 – Ecological and Integrated Pest Management; 108 students as lecture TA - 2019

Washington State University - Integrated Pest Management 452/552 – Pesticides and the Environment; 29 students as lecture TA – 2019

Pedagogical Trainings

2021	Strategies for Student Motivation (1-day workshop, University of Connecticut) Implemented in LEAP course design
2017	Process-Oriented Guided Inquiry Learning (POGIL) (1-day workshop, Washington State University) Implemented in Entomology 103 and LEAP course design

MENTORSHIP

STUDENT MENTORSHIP

Graduate Students (2) – mentored graduate student members of the lab to help them gain research and field work skills

2021–22 Amanda P. M.S. Student – project design consultation, lab technique mentorship and field support

2021-22 Brendan E. M.S. Student – project design consultation, lab skills mentorship

Undergraduate Students (11) – directly mentored undergraduate members of the lab to help them gain skills from insect rearing to gene amplification and dissection

2022-23 Marcela S.

2022-23 Lizzy D.

2022-23 Sophia L.

2022–23 Luciana L.

2021–22 Ben B. – B.S. in Molecular and Cellular Biology obtained

2021–22 Dylan A: independently funded SURF project: “Weird Wings: Development of morphological features characteristic of Tingidae in *Stephanitis pyroides*”

2021–22 Darren L.

2019–21 Kendrick G. - independent project, funded by departmental funds garnered by A. Hayes: “Analysis of tissue level trade-offs in the wing polyphenic sand cricket, *Gryllus firmus*”- B.S. obtained, now applying to med schools

2019–20 Vanessa R. - B.A. in Business Administration

2018–19 Katie G. - B.S. in Zoology, now in veterinary school

2016–18 Erin K. – B.S. in Animal Science, Washington State Department of Health Tick Identification Technician

PROFESSIONAL AND INSTITUTIONAL SERVICE

2023-24 Early Career Professional Representative between the Eastern Branch and National Entomological Society of America governing board

2022-23 Founder of Summer Picnic Days, Department of Ecology and Evolutionary Biology at the University of Connecticut

2021–23 Postdoctoral Representative for Department of Ecology and Evolutionary Biology Diversity, Equity and Inclusion committee at the University of Connecticut

2021–23 Postdoctoral Representative for Department of Ecology and Evolutionary Biology for faculty meetings at the University of Connecticut

2021-23 Founder of Biology Postdoctoral Research Society at University of Connecticut – Society forming community and garnering resources for Postdoctoral researchers and fellows across three biology departments at UConn

2020 Co-organizer and Moderator: e-Entomology: Inclusive Outreach in a Digital World Entomological Society of America – Virtual Meeting

2020 Co-organizer and Moderator: Small Orders Big Ideas: Orthopterists’ Society Meeting Entomological Society of America – Virtual Meeting

2019–20 Washington State University Graduate Student Representative to the Faculty Search Committee for the position of Insect Physiologist

2020 Pacific Branch of the Entomological Society of America Elevator Talk Coordinator

2019–20 Washington State University Entomology Graduate Student Association Student Choice Speaker Coordinator

- 2019–20 Washington State University and University of Idaho Bi-University Guest Speaker Series Coordinator
- 2019–20 Washington State University Linnean Games Team Captain
- 2018–19 Washington State University and University of Idaho Bi-University Guest Speaker Series Coordinator
- 2016–20 Washington State University Linnean Games Team Member
- 2017; 19 Entomological Society of America – WSU Student Debate Team
- 2016–20 Washington State University Entomology Graduate Student Association Social Committee Member

OUTREACH

- 2017–2021 Entomological Graduate Student Association Outreach Coordinator
- 2019–2021 Outreach Graduate Assistant
- 2017–2019 WSU Entomology Department Outreach Coordinator
- 2017-2023 Admin of Insect Identification – a Facebook group with over 80,000 members

- 2021 **Hayes, A. Spiders – Biology, Myths and Control. – Pesticide Safety Education Program – Washington State University**, Puyallup Research and Extension Center. Talk offered as part of a series of continuing education courses for Pest Management Professionals across Washington State – **Virtual Talk**
- 2019 **Hayes, A. The Status of Society Pollination on the Palouse – Solitary Bee Hotel Workshop – Palouse-Clearwater Environmental Institute (PCEI) – Moscow, ID**
- 2019 Ask Dr. Universe: Why can't sea turtles pull back into their shell?
<https://www.spokesman.com/stories/2019/jul/26/ask-dr-universe-why-cant-sea-turtles-pull-back-int/>
- 2018 Season of the spider: WSU scientists ease fears over arachnids of autumn
<https://news.cahnrs.wsu.edu/article/season-of-the-spider-wsu-scientists-ease-fears-over-arachnids-of-autumn/>
- 2018 Spidey sense: When eight-legged friends pay a visit
<https://dailyevergreen.com/42733/news/spidey-sense-when-eight-legged-friends-pay-a-visit/>
- 2017–21 Entomology Graduate Student Association Funding - application for and receipt of funds to run arthropod collection on an annual basis, totaling over \$1,500
- 2022 University of Connecticut Queer Science Conference Organizer and Demonstration Leader (<https://today.uconn.edu/2022/06/by-us-for-us-first-queer-science-conference-creates-connections/>)
- 2018–22 Administrator; Insect Identification Facebook Group – 75,000 members
- 2017–20 Richard S. Zack Living Arthropod Collection Founder and Curator
- 2017 Washington State University WiSTEM Guest Panelist

ARTHROPOD REARING AND GENOMICS EXPERIENCE

Bold species names indicate breeding colony status; *** represents functional genomics

Taxonomic Designation	Species Name	Taxonomic Designation	Species Name
Arthropoda			
Non-spider arachnids	<i>Thelyphonida</i> sp	Collembola	Arthropleona Sp
	<i>Phrynus marginemaculatus</i>		Symphyleona sp
Spiders – Mygalomorphae	<i>Caribena versicolor</i>	Ametabolous Insecta	<i>Thermobia domestica</i>***
	<i>Chromatopelma cyaneopubescens</i>	Hemimetabolous Insecta	
	<i>Grammastola pulchripes</i>	Orthoptera	<i>Gryllus firmus</i>***
	<i>Grammastola rosea</i>	Phasmatodea	<i>Extatosoma tiaratum</i>
	<i>Poecilotheria metallica</i>		<i>Carausius morosus</i>
	<i>Aphonopelma seemanni</i>		<i>Ramulus artemis</i>
	<i>Ceratogyrus marshalli</i>	Mantodea	<i>Idolomantis diabolica</i>
	<i>Pamphobetus sp platyomma</i>		<i>Phyllocrania paradoxa</i>
	<i>Idiothele mira</i>		<i>Hierodula venosa</i>
	<i>Davus pentaloris</i>		<i>Tenodera sinensis</i>
	<i>Avicularia avicularia</i>	Blattodea	<i>Blaptica dubia</i>
	<i>Avicularia braunshauseni</i>		<i>Gromphadorhina portentosa</i>
	<i>Avicularia juruensis</i> #2		<i>Blatta orientalis</i>
	<i>Ybyrapora diversipes</i>		<i>Therea petiveriana</i>
	<i>Tliltocatl albopilosum</i>		<i>Therea regularis</i>
	<i>Brachypelma boehmei</i>		<i>Therea olegrandjeani</i>
	<i>Homoemma sp Blue Peru II</i>	Hemiptera	<i>Oncopeltus fasciatus</i>***
	<i>Lampropelma violaceopes</i>		<i>Ranatra</i> sp
Spiders – Araneae	<i>Latrodectus Hesperus</i>		<i>Abedus herberti</i>
	<i>Misumena vatia</i>		<i>Lethocerus</i> sp.
	<i>Phidippus johnsoni</i>		<i>Leptoglossus zonatus</i>***

Myriapoda	<i>Phidippus audax</i>	Holometabolous Insecta	<i>Stephanitis pyroides</i> ***	
	<i>Ergatina atrica</i>			
	Lycosidae sp.		Neuroptera	Myrmeleontidae
	<i>Orthoporus ornatus</i>		Coleoptera	<i>Trypoxylus dichotomus</i> ***
	<i>Anadenobolus monilicornis</i>			<i>Gymnetis thula</i>
Crustacea	Polydesmid sp.		<i>Embaphion muricatum</i> ***	
	<i>Geophilomorpha</i> sp.		<i>Asbolus verrucosus</i>	
	Isopoda: Oniscidea		<i>Cryptoglossa variolosa</i>	
	<i>Procambarus virginalis</i>		<i>Cryptoglossa muricata</i>	
			<i>Eleodes</i> sp.	
			<i>Zopherus</i> sp.	
			<i>Trigonopeltastes</i> sp.	
			<i>Tenebrio molitor</i>	
			<i>Zophobas morio</i>	
			<i>Tribolium confusum</i>	
		<i>Tribolium castaneum</i> ***		
	Lepidoptera	<i>Manduca sexta</i>		
		<i>Smerinthus</i> sp.		
		<i>Galleria mellonella</i>		
	Diptera	<i>Hermetia illucens</i>		
		<i>Drosophila hydei</i>		
	Hymenoptera	<i>Polistes dominula</i>		

REFERENCES

Name	Relationship	Contact information
Elizabeth Jockusch	Postdoctoral Sponsoring Scientist	elizabeth.jockusch@uconn.edu
Laura Lavine	Ph.D. Major Advisor	lavine@wsu.edu
Richard S Zack	Ph.D. Committee member, Mentor for TA and Instructor of Record terms for Entom 103	zack@wsu.edu

PROFESSIONAL AFFILIATIONS

- Orthopterists' Society
- Entomological Society of America