

LAUREN E. FUESS, Ph.D.

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EDUCATION

PhD, University of Texas at Arlington, Quantitative Biology **2013-2018**
B.S., College of Charleston, Marine Biology, Summa Cum Laude **2008-2012**

ACADEMIC APPOINTMENTS

Assistant Professor, Texas State University **2020-present**
Postdoctoral Research Associate, University of Connecticut **2018-2020**
Advisor: Daniel Bolnick
Graduate Assistant, University of Texas at Arlington **2013-2018**
Advisor: Laura Mydlarz
Researcher, Marine Invasive Species Lab, Discovery Bay, Jamaica **2012-2013**
Supervisor: Dayne Buddo

RESEARCH FUNDING

total ~ \$390,000

Paul M. Angell Foundation Grant (2021, August). *Investigating biomarkers of resistance to Stony Coral Tissue Loss Disease*. PI: Sarah Gignoux-Woflsohn; Senior Personnel: **Lauren E. Fuess** (TXST **\$75,000**)

Gulf Research Program Early Career Researcher Fellowship (September 2021-August 2023). PI: **Lauren E. Fuess**. (TXST **\$76,000** Total)

ORSP Research Accelerator Funds (2021-2023). *Effects of aquatic nitrite on maternal immune transfer and offspring development in a live-bearing species*. co-PIs: Mar Huertas, **Lauren E. Fuess** & Caitlin Gabor (TXST **\$16,487**).

Texas State University Research Enhancement Program (2021). *Identifying predictors of host response to a novel coral disease*. PI: **Lauren E. Fuess** (TXST **\$8,000**).

American Association of Immunologists, Intersect Fellowship (February 2019-January 2020). *Development of single cell transcriptomic methods to investigate immunity in a model vertebrate-parasite system*. co-PIs: Daniel I. Bolnick & Jill Wegrzyn. Named Postdoc: **Lauren E. Fuess**. (UCONN **\$50,000** Total)

Research Grant, Beta Phi Chapter of the Phi Sigma Biological Honor Society (2016). *Investigating the effects of transforming growth factor beta and immune challenge on host gene expression in the Caribbean coral *Orbicella faveolata**. PI: **L. E. Fuess** (UTA **\$3,000**).

NSF Graduate Research Fellowship (June 2015-May 2018). *TGF β : The missing link between symbiont density and coral immune function?* PI: **Lauren E. Fuess** (UTA **\$138,000** Total)

Research Grant, Beta Phi Chapter of the Phi Sigma Biological Honor Society (2015).

*Investigating the effects of symbiont variation and immune challenge on host gene expression in the Caribbean coral *Orbicella faveolata*. PI: L. E. Fuess (UTA \$5,000).*

Research Grant, Beta Phi Chapter of the Phi Sigma Biological Honor Society (2014).

*Investigating the transforming growth factor β (TGF β) pathway in the coral *Orbicella faveolata*: Trade-offs between symbiont density and immune performance. PI: L. E. Fuess (UTA \$1,500).*

Fulbright Full Grant to Jamaica (August 2012-June 2013). PI: **Lauren E. Fuess** (\$20,000 Total)

PUBLICATIONS

h-index: 8; citations: 258

* - undergraduate author

1. Hund AK, **Fuess LE**, Kenney ML, Maciejewski MF, Marini JM, Shim KC, Bolnick DI. *in press*. Rapid evolution of parasite resistance via improved recognition and accelerated immune activation and deactivation. *Evol Lett*
2. **Fuess LE**, Weber JN, den Haan S, Steinel NC, Shim KC, Bolnick DI. 2021. Between-population differences in constitutive and infection-induced gene expression in threespine stickleback. *Mol. Ecol.* 30: 6791–6805. DOI: 10.1111/mec.16197.
3. **Fuess LE**, den Haan S, Ling F, Weber JN, Steinel NC, Bolnick DI. 2021. Immune gene expression covaries with gut microbiome composition in stickleback. *mBio.* 2 e00145-21. DOI: 10.1128/mBio.00145-21
4. MacKnight N, Cobleigh K, Lasseign, D, Chaves-Fonnegra A, Gutting A, Dimos BA, Antoine J, **Fuess LE**, Ricci CA, Butler CC*, Muller EM, Mydlarz LD, Brandt, ME. 2021. Microbial dysbiosis reflects disease resistance in diverse coral species. *Communications Biology*
5. **Fuess LE**, Palacio-Castro AM, Butler CC*, Baker AC, Mydlarz LD. 2020. Increased algal symbiont density reduces host immunity in a threatened Caribbean coral species, *Orbicella faveolata*. *Frontiers in Ecology and Evolution.* 8: 369. DOI: 10.3389/fevo.2020.572942
6. **Fuess LE**, Butler CC*, Brandt ME, Mydlarz LD. 2020. Investigating the roles of transforming growth factor-beta on immune response of *Orbicella faveloata*, a scleractinian coral. *Developmental and Comparative Immunology.* 107: 103639. DOI: 10.1016/j.dci.2020.103639
7. Dimos B, Mahmud SA, **Fuess LE**, Mydlarz LD, Pellegrino MW. 2019. Uncovering a mitochondrial unfolded protein response in corals and its role in adapting to a changing world. *Proceedings of the Royal Society B: Biological Sciences* 286: 20190470. DOI: 10.1098/rspb.2019.0470
8. Ricci CA, Kamal AMH, Chakrabarty JK, **Fuess LE**, Mann WT, Jinks LR*, Brinkhuis V, Chowdhury SM, Mydlarz LD. 2019. Proteomic investigation of a diseased gorgonian coral indicated disruption of essential cell function and investment in inflammatory and immune processes. *Integrative and Comparative Biology.* icz107. DOI: 10.1093/icb/icz107
9. **Fuess LE**, Mann WT, Jinks LR*, Brinkhuis V, Mydlarz LD. 2018. Transcriptional analyses provide new insight into the late-stage immune response of a diseased Caribbean coral. *Royal Society Open Science.* 5: 172062. DOI: 10.1098/rsos.172062
10. Williams LM, **Fuess LE**, *et al.* 2018. A conserved Toll-like receptor-to-NF- κ B signaling pathway in the endangered coral *Orbicella faveolata*. *Developmental and Comparative Immunology.* 79: 128-136. DOI: 10.1016/j.dci.2017.10.016

11. **Fuess LE**, Pinzon JC, Weil E, Ginshpon RD, Mydlarz, LD. 2017. Life or death: Disease resistant coral species activate autophagy following immune challenge. *Proceedings of the Royal Society B: Biological Sciences*. 284: 20170771. DOI: 10.1098/rspb.2017.0771
12. **Fuess LE**, Pinzon JC, Weil E, Mydlarz, LD. 2016. Associations between transcriptional changes and protein phenotypes provide insights into immune regulation in corals. *Developmental and Comparative Immunology*. 62: 17-28. DOI: 10.1016/j.dci.2016.04.017
13. Mydlarz LD, **Fuess LE**, Mann WT, Pinzon JC, and Gochfeld, DJ. 2016. Cnidarian immunity: from genomes to phenomes. In: *The Cnidaria, past, present and future. The world of Medusa and her sisters*. Editors: S. Goffredo and Z. Dubinsky. Springer.
14. **Fuess LE**, Eisenlord ME, Closek CJ, Tracy AM, Mauntz R, Gignoux-Wolfsohn S, et al. 2015. Up in arms: Immune and nervous system response to sea star wasting disease. *PLoS ONE*. 10: e0133053. DOI: 10.1371/journal.pone.0133053

In revision/In prep manuscripts:

15. **Fuess LE**, Hund AK, Kenney ML, Maciejewski MF, Marini JM, Shim KC, Bolnick DI. *in prep*. Transcriptional signatures of rapid evolution of parasite resistance via improved recognition. **Target Journal:** *Molecular Ecology*.
16. **Fuess LE** and Bolnick DI. *in prep*. Single-cell RNA sequencing of teleost immune organ reveals microevolution of immune system. **Target Journal:** *eLife*.
17. Weber JN, Steinel NC, Peng F, Shim KC, Lohman BK, **Fuess LE**, de Lisle S, Bolnick DI. *in prep*. Evolution of immunity to cestode parasites is a pyrrhic victory. **Target Journal:** *Science*.

PRESENTATIONS

T- talk, P- poster, *- presenting author, +- undergraduate author

21. Changsut IC^{+,*}, Schickle A⁺, Sharp K, **Fuess LE**. 2022. Comparison of immune phenotypes of colonies of *Astrangia poculata* with variable symbiont densities. Society for Integrative and Comparative Biology Annual Meeting. (T) *virtual due to COVID-19*
20. **Fuess LE**^{*}, Bolnick DI. 2022. Single cell transcriptomics reveal microevolution of immune cells across populations of three-spined stickleback. Society for Integrative and Comparative Biology Annual Meeting. (T) *virtual due to COVID-19*
19. **Fuess LE**^{*}. 2021. Meta-analysis reveals complex relationships between symbiosis, immunity, and the transforming growth factor β pathway in a Caribbean coral. 14th International Coral Reef Symposium. (T) *virtual due to COVID-19*
18. **Fuess LE**^{*}. 2021. Symbiommunity Lab: Understanding symbiosis-immune interplay in Cnidarians. Temperate Coral Research Conference. (T) *virtual due to COVID-19*
17. Changsut IC^{+,*}, Pugh J⁺, Schickle A⁺, Sharp K, **Fuess LE**. 2022. Comparison of immune phenotypes of colonies of *Astrangia poculata* with variable symbiont densities. Temperate Coral Research Conference. (T) *virtual due to COVID-19*
16. **Fuess LE**^{*}, Bolnick, DI. 2021. Single cell transcriptomics reveal microevolution of immune cells across populations of three-spined stickleback. Evolution. (T) *virtual due to COVID-19*
15. **Fuess LE**^{*}, den Haan S, Ling F, Weber J, Steinel NC, Bolnick DI. 2021. Immune gene expression covaries with gut microbiome composition in stickleback. American Society of Naturalists Virtual Asilomar. (T) *virtual due to COVID-19*

14. **Fuess LE***, den Haan S, Ling F, Weber J, Steinel NC, Bolnick DI. 2021. Immune gene expression covaries with gut microbiome composition in stickleback. Society for Integrative and Comparative Biology Annual Meeting. (T) *virtual due to COVID-19*
13. **Fuess LE***, Weber J, Steinel NC, den haan S, Bolnick DI. 2020. Transcriptomic analyses of *Gasterosteus aculeatus* parasite response reveal mechanisms of resistance. Society For Integrative And Comparative Biology Annual Meeting; Austin, TX (T)
12. **Fuess LE***, Palacio A, Butler CC⁺, Brandt ME, Baker AC, Mydlarz LD. 2019. Multiple experiments reveal complex relationships between symbiosis, immunity, and the transforming growth factor-beta pathway in a Caribbean coral, *Orbicella faveolata*. Society For Integrative And Comparative Biology Annual Meeting; Tampa, FL (T)
11. **Fuess LE*** & Bolnick DI. 2019. Fibroblast culture and gene editing methods to investigate evolution and cellular mechanisms of parasite resistance in *Gasterosteus aculeatus*. NSF EDGE Grant PI Meeting. Alexandria, VA (P)
10. **Fuess LE***, Webber J, Steinel N, Den Haan S, Bolnick DI. 2019. Transcriptional analysis of the effects of genetic variation on response of *Gasterosteus aculeatus* (three spined stickleback) to a cestode parasite. Evolution; Providence, RI (T)
9. **Fuess LE***, Palacio A, Butler CC⁺, Brandt ME, Baker AC, Mydlarz LD. 2018. A multi-experiment approach to investigate the relationship between symbiosis, immunity, and the transforming growth factor-beta pathway in a Caribbean coral, *Orbicella faveolata*. International Symbiosis Society Conference; Corvallis, OR (T)
8. **Fuess LE***, Palacio A, Baker AC, Mydlarz LD. 2018. Frenemies: *Symbiodinium* density negatively affects immune response in the Caribbean coral *Orbicella faveolata*. Society For Integrative And Comparative Biology Annual Meeting; San Francisco, CA (T)
7. **Fuess LE***, Pinzon JC, Ricci CA, Weil E, Mydlarz LD. 2017. No free lunch: Implications of symbiotic relationships on the coral immune response via the transforming growth factor-beta signaling pathway. Biomedical & Comparative Immunology Symposium; Fort Lauderdale, FL (T)
6. **Fuess LE***, Mann WT, Brinkhuis V, Stacy C*, Mydlarz LD. 2017. Octocorals demonstrate fitness tradeoffs associated with response to a disease outbreak. Society For Integrative And Comparative Biology Annual Meeting; New Orleans, LA (T)
5. **Fuess LE***, Pinzon JC, Ricci CA, Weil E, Mydlarz LD. 2016 No free lunch: Implications of symbiotic relationships on the coral immune response via the transforming growth factor-beta signaling pathway. International Coral Reef Symposium; Honolulu, HI (T)
4. **Fuess LE***, Pinzon JC, Weil E, Mydlarz LD. 2016. Comparison of immune phenotypes and changes in gene expression provides new insight into pathways of coral immunity. Society For Integrative And Comparative Biology Annual Meeting;
3. **Fuess LE***, Eisenlord ME, Closek CJ, Tracy AM, Mauntz R, Gignoux-Wolfsohn S, Mortish MM, Yoshioka R. A * farewell to arms: Sea star transcriptome reveals insights into immune response. Ecology of Infectious Marine Diseases Research Coordination Network Meeting; Friday Harbor, WA (T)
2. **Fuess LE***, Jiang L. 2012. Top down and bottom up regulation of community assembly. Ecological Society of America Annual Meeting; Portland, OR (P)
1. **Fuess LE***, Shedlock AM, Wham FC, Dustan P. 2012. A molecular assay for the cause of bleaching in the temperate Atlantic coral species *Oculina arbuscula*. Society For Integrative And Comparative Biology Annual Meeting; Charleston, SC (P)

INVITED SEMINARS AND WORKSHOPS

Symbiodineaceae Workshop; Invited Participant	2021
American Society of Microbiologists, Texas Branch Meeting; Invited Presentation	2021
College of the Holy Cross, Schaffer Family Seminar Series, Biology Department	2019
NSF Reintegrating Biology Workshop; Invited Participant	2019
University of Connecticut, EEB Departmental Seminar Series	2018
St. Edwards University, Biology Seminar Series	2017
University of Texas at Arlington Mu Sigma Society Meeting	2017

TEACHING EXPERIENCE

Courses Designed and Taught

BIO 4351J/5351J: Comparative Immunology (undergraduate/graduate)	Fall 2021
BIO 7361F: Immunity in the Wild (graduate)	Spring 2021

Guest Lectures

Evolutionary Medicine (undergraduate)	University of Connecticut	2019
Introduction to Biology (undergraduate; honors),	UT Arlington	2016 & 2017
Conservation Biology (graduate)	UT Arlington	2015 & 2016

STUDENT MENTORSHIP

Student Research Supervised at Texas State

Isabella Changsut	M.S Student	2021-present
<i>Thesis: Investigating the effects of facultative symbiosis on immunity in a temperate coral</i>		
Natalie Villafranca	M.S Student	2021-present
<i>Thesis: Investigating the role of the coral microbiome in immunological memory</i>		
Sofia Diaz de Villegas	M.S. Student	2021-present
Jordan Pugh	Undergraduate	2020-2021
<i>Senior Project: Examining constitutive variation in immunity in a facultatively symbiotic coral</i>		
Haley Womack	Undergraduate	2021-present

Supervisory Committee Membership at Texas State

Amanda Bryant	Ph.D Student; Texas State	2021-present
Chloe Troupe	M.S. Student; Texas State	2021-present
Alexis Hailey	M.S. Student; Texas State	2021-present
Chloe Reeves	M.S. Student; Texas State	2020-2021
<i>Thesis: Natural hybridization and introgression of Berberis trifoliolata and Berberis swaseyi in the Edwards Plateau.</i>		

Undergraduate Students Supervised at Other Institutions

Sophia Aruna	University of Connecticut	2020
Mita Kale	University of Connecticut	2019-2020
Julia Meenan	University of Connecticut	2019-2020
Gillian McNeil	University of Connecticut	2019
Sarah Tsuro	University of Connecticut	2018-2020

Caleb Butler	University of Texas, Arlington	2016-2018
Margaret Park	University of Texas, Arlington	2015

AWARDS AND SMALL GRANTS

SICB DEE Huey Award for Best Student Presentation, Finalist	2018
Beta Phi Chapter, Phi Sigma Biological Honor Society Travel Grant	2017
Outstanding Graduate Research Award	2016
Beta Phi Chapter, Phi Sigma Biological Honor Society Travel Grant	2016
University of Texas Arlington Dean's Award for Oral Presentation	2016
NSF Graduate Research Fellowship Honorable Mention	2015
Beta Phi Chapter, Phi Sigma Biological Honor Society Travel Grant	2015

PROFESSIONAL ACTIVITIES

Reviewer: eLife; Coral Reefs; Marine Biology; Scientific Reports; Science Advances; Molecular Ecology; Frontiers in Marine Science; Royal Society Open Science; Genome Biology and Evolution; Journal of Experimental Biology; Proceedings of the Royal Society B: Biological Sciences; Comparative Biochemistry and Physiology Part D: Genomics and Proteomics

Society Membership: Society for Integrative and Comparative Biology; International Coral Reef Society; Beta Phi Chapter of the Phi Sigma Biological Honors Society

OUTREACH AND SERVICE

SICB Broadening Participation Mentor Match Program	2021-present
SICB Meet an Ecoimmunologist/Disease Ecologist Program	2021-present
American Society of Microbiologists, Texas Branch Meeting, Poster Judge	2020
SICB Presentation Judge	2019-present
Skype a Scientist	2019-present
EEB Mentor Match	2019
LSAMP Undergraduate Research Experience Instructor, Roatan, Honduras	2017
Fair Park Aquarium Homeschool Day	2017
<i>Hands on coral reef exhibit</i>	
EcoFest, Arlington, TX	2015
<i>Hands on coral reef exhibit (~500 people)</i>	
Radio Interview on Sea Star Wasting Disease, KERA, Dallas, TX	2015
Classical Conversations Middle School Science Fair Judge	2015
iENGAGE undergraduate research mentor	2015
Earth Day Texas, Dallas, TX	2014-15;2018
<i>Hands on coral reef exhibit (>1000 people/year)</i>	
Fort Worth Regional Science Fair Judge	2014; 2017
UTA ACES Undergraduate Poster Session Judge	2014; 2017
Rainforest Seafood Festival, Montego Bay, Jamaica	2013
<i>Interactive walk-through exhibit themed as a submarine</i>	
Marine Invasive Species Laboratory Outreach Ambassador, Jamaica	2012-2013