# JEFFREY A. RIFFELL
## CURRICULUM VITAE

University of Washington
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## EDUCATION

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|---|---|---|
| UC Los Angeles | Ph. D. in Physiology | 2004 |
| UC Santa Cruz | B.A. in Biology, Chemistry | 1996 |

## EMPLOYMENT

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|---|---|---|
| Endowed Professor | Dept. Biology, Univ. Washington | 2019-current |
| Associate Professor | Dept. Biology, Univ. Washington | 2015-2018 |
| Assistant Professor | Dept. Biology, Univ. Washington | 2010-2015 |
| Postdoctoral Fellow | University of Arizona | 2004-2010 |

**RESEARCH INTERESTS:** Chemical Ecology; Olfactory-mediated behaviors; Plant-insect interactions; Neuroscience; Disease vector sensory ecology and neurobiology.

## HONORS, FELLOWSHIPS AND AWARDS

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| Kavli Foundation Fellow: Neurobiology in Changing Ecosystems | 2024 |
| National Geographic Explorer | 2018 |
| CoMotion Innovator | 2018 |
| Endowed Professor for Excellence in Biology | 2015 |
| Kavli Frontiers of Science Fellow | 2011 |
| International Society for Neuroethology, Young Investigator Award | 2010 |
| Polak Young Investigator Award, AChemS | 2009 |
| Cota-Robles Fellow, UC Los Angeles | 1998 |

## CURRENT and SUBMITTED RESEARCH GRANTS ($23,923,023 awarded 2020-2028)

### *SUBMITTED:*

Air Force Office of Scientific Research (PI) "mSWARM: mosquito Sensory integration With Acoustic and Visual Response Mechanisms" ($2,084,195 to UW) — *Pending*

*National Institutes of Health (PI) "The olfactory basis of locating nectar sugar sources in Aedes aegypti mosquitos" ($3,870,622) — *Pending*

- Received 6% score

Air Force Office of Scientific Research (PI) "Mosquito Sensory Integration for Bio-Inspired Models" ($352,065 to UW) — *Pending*

National Science Foundation (CoPI) "The pleiotropic role of the mosquito maxillary palp in the olfactory identification of plant and human hosts." ($497,534 to UW) — *Pending*

***AWARDED:***

Air Force Office of Scientific Research (PI) "Mechanisms of insect swarm formation and behavior" ($150,000) — 2025-2027

National Science Foundation (PI) "NiCE: Olfaction in the Anthropocene" ($800,000) — 2024-2027

National Institutes of Health (PI) "Competitive Supplement for Olfactory modulation of color vision and behavior in mosquitoes" ($652,237) — 2024-2027

National Science Foundation (PI) "Olfactory basis of learning in mosquitoes" ($1,000,000). — 2023-2026

NIH-NIAID (PI) "Competitive Supplement for The olfactory basis of locating nectar sugar sources in Aedes aegypti mosquitoes" ($281,536) — 2023-2026

Air Force Office of Scientific Research – Multi-University Research Initiative (PI) "Flexible, multimodal integration of decision and control in a spike resolved sensorimotor program for flight" ($7,500,000, total) — 2023-2028

NIH-NIAID (PI) "R01: Visual and olfactory integration in mosquitoes" ($3,367,760) — 2023-2028

NIH-NIAID (PI, with S. Luckhart UI) "R01: Biogenic amines, malaria and manipulation of mosquito physiology and behavior" ($2,727,122, total) — 2022-2026

National Science Foundation (PI) "Neural basis of olfactory behaviors in a unique mosquito-flower association" ($800,000). — 2022-2026

NIH-NIAID (PI) "R01: Olfactory basis of nectar-seeking in mosquitoes" ($3,125,649) — 2021-2026

Human Frontiers in Science Foundation (PI). "How do malaria mosquitoes swarm and mate? The functional biology of mating swarms"($335,000 to UW) — 2021-2024

Gates Foundation (PI). "Re-engineering insect odorant receptors" ($2,000,000) — 2021-2023

Air Force Office of Scientific Research (PI) "Neural and behavioral bases of sensory integration in the mosquito" ($1,168,719) 2020-2024

Graduate Student and Postdoc Research Awards:

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| Xiaodi Wang, PhD | Washington Research Foundation | 2025-2028 |
| Takuro Ohashi, PhD | Human Foundation Science Foundation | 2026-2029 |
| Genevieve Tauxe, PhD | NIH Return Supplement | 2024-2027 |
| Melissa Léon-Noreña | NIH Training Supplement ($324,000) | 2023-2026 |
| Melanie Anderson, PhD | Washington Research Foundation | 2022-2026 |
| Claire Rusch | UWIN Graduate Fellowship | 2016-2018 |
| Eleanor R Lutz | NSF GRFP ($132,000) | 2015-2018 |
| Yasmeen Hussain | NSF GRFP ($132,000) | 2013-2016 |
| Marie Clifford | NSF-GRFP ($132,000) | 2012-2015 |
| Kelsey J. P. Byers | NSF-IOS-DDIG, NSF-GRFP ($145,000) | 2012-2014 |

## PATENTS / RECORD OF INNOVATIONS

- Patent 62/808,710 filed 2/21/2019 Entitled: MOSQUITO ATTRACTANT COMPOSITIONS. Inventors: Jeffrey Riffell UW Reference: 48294.01US1
- Patent US US11703882B2, filed 2020-05-20, Granted 2023-07-18, Published 2023-07-18. Entitled: BIO-HYBRID ODOR-GUIDED AUTONOMOUS PALM-SIZED AIR VEHICLE Inventors: Melanie Anderson, Tom Daniel, Jeff Riffell.

## PUBLICATIONS (*denote authors contributed equally)

**2026:**

97. Vainer, Y., Sar-Shalom, E., Wang, Y., Huff, R.M., Perets, D., Yakir, E., Ghaninia, M., Coutinho-Abreu, I.V., Ruiz, C., Rajamanickam, D. and Warburg, A., Akbari, O.S., Papathanos, P.A., Ignell, R., **Riffell, J.A.**, Pitts, R.J., and Bohbot, J.D. 2026. Sensory coding of borneol repellency in culicine mosquitoes via the Or49 pathway. *Nature Communications*, 2026.
    - Featured on UW webpage "*A built-in warning system: How mosquitoes detect a common compound in plant-based mosquito repellent*."

**2025:**

96. Leon-Noreña, Jandu, S., Boyi, J., Bouzada, L.I., Rouyar, A., Coutinho-Abreu, I.V., Chen, F., Akbari, O.S., Pitts, R.J., and **Riffell, J.A.** 2025. The olfactory neurobiology and chemical ecology of mosquito attraction to plant nutrient sources. *Proceedings of the Royal Society, B.* 292, no. 2057.

95. Yang, H., Kc, P., Chen, P., Lei, H., Sponberg, S., Tarokh, V. and **Riffell, J.A.**, 2025. Neuron synchronization analyzed through spatial-temporal attention. *Frontiers in Computational Neuroscience*, 19, p.1655462.

94. Leon-Noreña, M., Tauxe, G. M., & **Riffell, J. A.** 2025. Olfactory preferences and chemical differences of fruit odors for Aedes aegypti mosquitoes. *Journal of Experimental Biology*, 228(18), jeb250305.

93. Wei, J.N., Ruiz, C., Vlot, M., Sanchez-Lengeling, B., Lee, B.K., Berning, L., Vos, M.W., Henderson, R.W., Qian, W.W., Sanders, J.N. and Ando, D.M., Groetsch, K.M., Gerkin, R.C., Wiltschko, A.B., **Riffell, J.A**., and Dechering, K.J. 2025. A deep learning and digital archaeology approach for mosquito repellent discovery. *Chemical Senses*, 50, p.bjaf021.

    - Featured in Reuters "*Using AI to create mosquito-repellent odours*."

92. Blake, A. J., & **Riffell, J. A**. 2025. Spectral preferences of mosquitos are altered by odors. *Journal of Experimental Biology*, jeb-250318.

    - Journal of Experimental Biology's "Editor's Choice" for the month of September.
    - Adam Blake featured as an Early Career Researcher in the issue.

91. Ochwedo, K., Wang X., Céspedes, N., Bentil, R.E., Wild, R., Hernandez, E., Hernandez, A., Kaylor, H.L., Debebe, Y., Datta, J., Robert, M.A., **Riffell, J.A.**, Lewis, E.E., and Luckhart S. 2025. Regulation of diel locomotor activity and retinal responses of Anopheles stephensi by ingested histamine and serotonin is temperature- and infection-dependent. *PLoS Pathogens* 21, no. 4 (2025): e1013139.

90. Swore, J., Anderson, M., Dominguez, M., Daniel, T. and **Riffell, J.A.**, 2025. Classification of odor-derived electroantennograms with machine learning. *Integrative Organismal Biology*, 7(1), p.obaf038.

**2024:**

89. Chan, J.K., Parasurama, S., Atlas, R., Xu, R., Jongebloed, U.A., Alexander, B., Langenhan, J.M., Thornton, J.A. and **Riffell, J.A.**, 2024. Olfaction in the Anthropocene: NO3 negatively affects floral scent and nocturnal pollination. *Science*, 383(6683), pp.607-611.

- Featured in: NYTimes, Reuters, CNN, BBC, NPR National, NBC, Science Daily, UW Daily, others: "Polluted Flowers Smell Less Sweet to Pollinators, Study Finds"]

88. Gupta, S., Cribellier, A., Poda, S.B., Roux, O., Muijres, F.T. and **Riffell, J.A.**, 2024. Multisensory integration in Anopheles mosquito swarms: The role of visual and acoustic information in mate tracking and collision avoidance. *Current Biology 34, no. 18 (2024): 4091-4103*.

87. Rouyar, A., Patil, A.A., Leon-Noreña, M., Li, M., Coutinho-Abreu, I.V., Akbari, O. and **Riffell, J.A**., 2024. Transgenic line for characterizing GABA-receptor expression to study the neural basis of olfaction in the yellow-fever mosquito. *Frontiers in Physiology*, 15, p.1381164.

**2023:**

86. Gupta, S., Blake, A.J. and **Riffell, J.A.**, 2023. Mosquito biology: Scents and selectability. *Current Biology*, 33(12), pp.R686-R688.

85. Lahondère, C., Vinauger, C., Liaw, J.E., Tobin, K.K., Joiner, J.M. and **Riffell, J.A.**, 2023. Effect of temperature on mosquito olfaction. *Integrative and Comparative Biology*, 63, 356–367, https://doi.org/10.1093/icb/icad066

84. Coles, T.A., Briggs, A.M., Hambly, M.G., Céspedes, N., Fellows, A.M., Kaylor, H.L., Adams, A.D., Van Susteren, G., Bentil, R.E., Robert, M.A. and **Riffell, J.A.**, Lewis, E.E., and Luckhart, S. 2023. Ingested histamine and serotonin interact to alter Anopheles stephensi feeding and flight behavior and infection with Plasmodium parasites. *Frontiers in Physiology*, 14.83.

83. San Alberto, D.A., Rusch, C. and **Riffell, J.A.** 2023. Conducting an Analysis of Mosquito Flight Behaviors in a Wind Tunnel. *Cold Spring Harbor protocols*. doi: 10.1101/pdb.prot108257

82. Vinauger, C. and **Riffell, J.A.** 2023. Tethered Preparation for the Analysis of Mosquito visual-motor responses using modular visual displays. *Cold Spring Harbor Protocols*. doi: 10.1101/pdb.prot108179

81. Wolff, G.H., Lahondère, C., Vinauger, C., Rylance, E. and **Riffell, J.A**., 2023. Neuromodulation and differential learning across mosquito species. *Proceedings of the Royal Society B*, 290(1990), p.20222118.

**2022:**

80. Briggs, A.M., Hambly, M.G., Simão-Gurge, R.M., Garrison, S.M., Khaku, Z., Van Susteren, G., Lewis, E.E., **Riffell, J.A.** and Luckhart, S., 2022. *Anopheles stephensi* Feeding, Flight Behavior, and Infection With Malaria Parasites are Altered by Ingestion of Serotonin. *Frontiers in Physiology*, 13, pp. 1036-1045.
79. Gupta, S., and J**. A. Riffell**. "Chapter 30: Sensory neurophysiology and integration in mosquitoes." *In Sensory ecology of disease vectors*, pp. 773-799. Wageningen Academic Publishers, 2022.
78. Alonso San Alberto, D., Rusch, C., Zhan, Y., Straw, A.D., Montell, C. and Riffell, J.A., 2022. The olfactory gating of visual preferences to human skin and visible spectra in mosquitoes. *Nature Communications*, 13(1), pp.1-14.

    [Featured in: *Scientific American*, BBC, NPR National, CBS, NBC, CNN, Science Daily]

**2021:**

77. Santana, S.E., Kaliszewska, Z.A., Leiser-Miller, L.B., Lauterbur, M.E., Arbour, J.H., Dávalos, L.M. and **Riffell, J.A**., 2021. Fruit odorants mediate co-specialization in a multispecies plant–animal mutualism. *Proceedings of the Royal Society B*, 288(1956), p.20210312.
76. Rodriguez, A.M., Hambly, M.G., Jandu, S., Simão-Gurge, R., Lowder, C., Lewis, E.E., **Riffell, J.A.** and Luckhart, S., 2021. Histamine Ingestion by Anopheles stephensi Alters Important Vector Transmission Behaviors and Infection Success with Diverse Plasmodium Species. *Biomolecules*, 11(5), p.719.
75. Coutinho-Abreu, I. V., Riffell, J.A., Akbari, O.S. 2021. Human attractive cues and mosquito host-seeking behavior. *Trends in Parasitology*.
74. Rusch, C., San Alberto, D. A., & **Riffell, J. A**. 2021. Visuo-motor feedback modulates neural activities in the medulla of the honeybee, Apis mellifera. *Journal of Neuroscience,* 41(14), pp.3192-3203.
73. **Riffell, J. A.** 2021. The neuroecology of insect-plant interactions: The importance of physiological state and sensory integration. *Current Opinion in Insect Science.*
72. Zhan, Y., San Alberto, D.A., Rusch, C., Riffell, J.A. and Montell, C., 2021. Elimination of vision-guided target attraction in Aedes aegypti using CRISPR. *Current Biology*. doi.org/10.1016/j.cub.2021.07.003

    [Featured in: New York Times, BBC, NPR National, CBS, NBC, CNN, Science Daily, Phys.org, UW Daily]

**2020:**

71. Leiser-Miller, L.B., Kaliszewska, Z.A., Lauterbur, M.E., Mann, B., **Riffell, J.A.** and Santana, S.E., 2020. A fruitful endeavor: scent cues and echolocation behavior used by Carollia castanea to find fruit. *Integrative Organismal Biology*, 2(1), p.obaa007.
70. Lutz, E.K., Ha, K.T. and **Riffell, J.A.**, 2020. Distinct navigation behaviors in Aedes, Anopheles and Culex mosquito larvae. *Journal of Experimental Biology*, *223(7)*.
69. Lahondère, C., Vinauger, C., Okubo, R.P., Wolff, G.H., Chan, J.K., Akbari, O.S.

and **Riffell, J.A.**, 2020. The olfactory basis of orchid pollination by mosquitoes. *Proceedings of the National Academy of Sciences, 117, 708-716*.

Featured in: BBC, NPR National, NBC, Science Daily, UW Daily, others: "Mosquitoes are drawn to flowers as much as people -- and now scientists know why"]

68. Melo, N., Wolff, G.H., Costa-da-Silva, A.L., Arribas, R., Triana, M.F., Gugger, M., **Riffell, J.A.**, DeGennaro, M. and Stensmyr, M.C., 2019. Geosmin attracts Aedes aegypti mosquitoes to oviposition sites. *Current Biology, 30(1), pp.127-134*.

**2019:**

67. **Riffell, J.A.**, 2019. Olfaction: Repellents that congest the mosquito nose. *Current Biology*, 29(21), pp.R1124-R1126.
66. Chittka, L., Giurfa, M. and **Riffell, J.A.**, 2019. The Mechanisms of Insect Cognition. *Frontiers in Psychology*, *10, p.2751*.
65. Lutz, E.K., Grewal, T.S., and **Riffell, J.A**. 2019. Computational and experimental insights into the chemosensory navigation of *Aedes aegypti* mosquito larvae. *Proceedings of the Royal Society, B*. *286, 1-10*. .
64. Vinauger, C., Van Breugel, F., Locke, L., Tobin, K., Dickinson, M., Fairhall, A., Akbari, O. and **Riffell, J.A**., 2019. Visual-olfactory integration in the human disease vector mosquito, Aedes aegypti. *Current Biology*, *29, 2509–2516*
63. Shyong, J.*, Lutz, E.*, Bui, M., Yang, T., Li, M., Truong, K., Arvidson, R., Buchman, A., **Riffell, J.A.**, and Akbari, O.S. Live calcium imaging of odor-evoked responses in *Aedes aegypti* neuronal tissues reveals distinct olfactory responses in larva. *BMC Neuroscience*, 20: 27-35.

**2018:**

62. Delahunt, C., **Riffell, J. A.**, and Kutz, N. 2018. Biological mechanisms for learning: A computational model of olfactory learning in the *Manduca sexta* moth. *Frontiers in Computational Neuroscience*, 12: 1-20.
61. Wang, T., Clifford, M., Martínez-Gómez, J., Johnson, J., **Riffell, J.A.**, and Di Stilio, V. Scent Matters: Repeated loss of insect attraction by floral scent accompanies transitions to wind pollination. *Annals of Botany doi.org/10.1093/aob/mcy131*
60. Wolff, G.H., and **Riffell, J.A.** 2018. Olfaction, experience and neural mechanisms underlying mosquito host preference. *Journal of Experimental Biology*, 221(4), jeb157131.
59. Fenske, M.P., Nguyen, L.P., Horn, E.K., **Riffell, J.A.**, and Imaizumi, T. 2018. Circadian clocks of both plants and pollinators influence flower seeking behavior of the pollinator hawkmoth Manduca sexta. *Scientific reports*, 8(1), 2842.
58. Pang, R., van Breugel, F., Dickinson, M.H., **Riffell, J.A.**, and Fairhall, A. 2018. History dependence in insect flight decisions during odor tracking. *PLoS Computational Biology* 14(2): e1005969.
57. Vinauger, C., Lahondere, C., Wolff, G.H., Locke, L.T., Liaw, J.E., Parrish, J.Z.,

Ackbari, O.S., Dickinson, M.H., and **Riffell, J.A.** 2018. Modulation of host learning in *Aedes aegypti* mosquitoes. *Current Biology* 28(3): 333-344.

[Featured in: New York Times, BBC, The Guardian, NPR, CBS, NBC, CNN, Science Daily, Phys.org, UW Daily, others: "If you swat mosquitoes, they may learn to avoid your scent"]

**2017:**

56. Blazka, D., Sanders, E., **Riffell, J.A**., and Shlizerman, E. 2017. Classification of fixed point network dynamics from multiple node timeseries data. *Frontiers in Neuroinformatics,* https://doi.org/10.3389/fninf.2017.00058
55. Zhao, Y., Chan, J., Lopez-Hilfiker, F.D., **Riffell, J.A**., and Thornton, J.A. 2017. An electrospray chemical ionization source for real-time measurement of atmospheric organic and inorganic compounds. *Atmospheric Measurement Techniques,* 10: 3609-3625.
54. Rusch, C., Roth, E., Vinauger, C., and **Riffell, J.A.** 2017. Honeybees in a virtual reality environment learn unique combinations of colour and shape. *Journal of Experimental Biology* 220: 3478-3487.
53. Lutz, E.K., Lahondere, C., Vinauger, C., and **Riffell, J.A.** 2017. Olfactory learning and chemical ecology of olfaction in disease vector mosquitoes: A life history perspective. *Current Opinion in Insect Science,* 20, 75–83.
52. **Riffell, J.A.** 2017. Plant defense: Timing is everything. *Current Biology*, 27, R344–R346.
51. Hussain, Y.H., Sadilek, M., Salad, S., Zimmer, R.K. and **Riffell, J.A.** 2017. Individual female differences in chemoattractant production change the scale of sea urchin gamete interactions. *Developmental Biology*, 422, 186–197. http://dx.doi.org/10.1016/j.ydbio.2017.01.006

**2016:**

50. **Riffell, J.A.**, and Rowe, A.H. 2016. Neuroecology: Neural Mechanisms of Sensory and Motor Processes that Mediate Ecologically Relevant Behaviors. *Integrative and Comparative Biology* 56: 853-856.
49. Vinauger, C., Lahondère, C., Cohuet, A., Lazzari, C.R., and **Riffell, J.A.** 2016. Learning and Memory in Disease Vector Insects. *Trends in Parasitology*, http://dx.doi.org/10.1016/j.pt.2016.06.003.
48. Ho, W.W., and **Riffell, J.A.** 2016. The Olfactory Neuroecology of Herbivory, Hostplant Selection and Plant–Pollinator Interactions. *Integrative and Comparative Biology*, http://dx.doi.org/10.1093/icb/icw096.
47. Rusch, C., Broadhead, G.T., Raguso, R.A., and **Riffell, J.A.** 2016. Olfaction in context–sources of nuance in plant-pollinator communication. *Current Opinion in Insect Science*, http://dx.doi.org/10.1016/j.cois.2016.03.007.
46. Hussain, Y.H., Guasto, J.S., Zimmer, R.K., Stocker, R. and **Riffell, J.A.** 2016. Sperm chemotaxis promotes individual fertilization success in sea urchins. *Journal of Experimental Biology*, pp.jeb-134924.

**2015:**

45. Lundin, J., **Riffell, J.A.**, and Wasser, S.K. 2015. Polycyclic aromatic hydrocarbons in caribou, moose, and wolf scat samples from three areas of the Alberta oil sands. *Environmental Pollution*, 206: 527–534.
44. Reisenman, C. E., and **Riffell, J.A.** The neural bases of host plant selection in herbivorous insects in a Neuroecology framework. *Frontiers in Physiology*, 6.
43. van Breugal, F., **Riffell, J.A.**, Fairhall, A., and Dickinson, M. H. 2015. Mosquitoes Use Vision to Associate Odor Plumes with Thermal Targets. *Current Biology*, 25: 2123-2129
42. Fenske, M.P., Hazelton, K.D., Hempton, A.K., Shim, J.S., **Riffell, J.A.**, and Imaizumi, T. 2015. The circadian clock gene *LATE ELONGATED HYPOCOTYL* directly regulates the timing of floral scent emission in *Petunia*. *Proceedings of the National Academy of Sciences, USA*; 131:9775-9780.

**2014:**

41. **Riffell, J.A.**, Shlizerman, E., Sanders, E. Abrell, L., Medina, B. Hinterwirth, A.J., Kutz, J.N. 2014. Flower discrimination by pollinators in a dynamic chemical environment. *Science,* 344:1515-1518.

    [Featured in: *Science Perspectives*, New York Times, BBC, NPR National, CBS, NBC, CNN, Science Daily, Phys.org, UW Daily, others: “Fumes Keep Moths From Finding Flowers”]

40. **Riffell, J.A.** and Hildebrand J.G. 2014. Insect olfactory filters in mediating natural, ecologically relevant behaviors. Insect Neuroethology, ed. E. Warrant.
39. Shlizerman, E., **Riffell, J.A.**, and Kutz, J.N. 2014. Data-driven inference of network connectivity for modeling the dynamics of neural codes in the insect antennal lobe. *Frontiers in Computational Neuroscience*. doi: 10.3389/fncom.2014.00070.
38. Vinauger, C., Lutz, E.K., **Riffell, J.A.** 2014. Olfactory learning and memory in the disease vector mosquito, *Aedes aegypti*. *Journal of Experimental Biology*. 217, 2321-2330.
37. Byers, K.J.R.P., Bradshaw, H.D., **Riffell, J.A.** 2014. Three floral volatiles contribute to differential pollinator attraction in monkeyflowers (*Mimulus*). *Journal of Experimental Biology*. 217: 614-623.
36. Byers, K.J., Vela, J., **Riffell, J.A.**, Bradshaw, H.D. 2014. Floral volatile alleles can contribute to pollinator-mediated reproductive isolation in monkeyflowers (*Mimulus*). *The Plant Journal*. 80, 1031-1042.

**2013:**

35. **Riffell, J.A.**, Lei, H., Abrell, A., Hildebrand, J.G. 2013. Neural basis of a pollinator’s buffet: olfactory specialization and learning in *Manduca sexta*. *Science* 339: 200-204.

    [Recommended by Faculty of 1000; featured in: e!Science News, Science Daily, Phys.org, others: “Moths wired two ways”]

34. **Riffell, J.A.** 2013. Neuroethology: Lemon-fresh scent makes flies lay eggs. *Current Biology*, 23, R1108-R1110.
33. Sprayberry, J.D.H., Ritter, K.A.,**Riffell, J.A.** 2013. The effect of olfactory exposure to non-insecticidal agrochemicals on bumblebee foraging behavior. *PLoS ONE* 8(10): e76273. doi:10.1371/journal.pone.0076273
32. Martin, J.P., Lei, H., **Riffell, J.A**., Hildebrand, J.G. 2013. Enhanced synchrony of antennal-lobe projection neurons encodes the behaviorally effective ratio of sex-pheromone components in male *Manduca sexta*. *Journal of Comparative Physiology A* 199: 963-979.
31. **Riffell, J.A**. and Alarcon, R. 2013. Multimodal floral signals and moth foraging decisions. *PLoS-ONE* 8(8): e72809. doi:10.1371/journal.pone.0072809.
30. Clifford, M.R., **Riffell, J.A.** 2013. Mixture and odorant processing in the olfactory systems of Insects: a comparative perspective. *Journal of Comparative Physiology A.* 199:911-928. doi: 10.1007/s00359-013-0818-6
29. Fricke, E.C., Simon, M.J., Reagan, K.M., Haak, D.C., Levey, D.J., **Riffell, J.A.**, and Tewksbury, J.J. 2013. When condition trumps location: seed consumption by fruit-eating birds removes pathogens and predator attractants. *Ecology Letters* 16:1031-1036.
28. **Riffell, J.A.,** Reisenman, C.A., Hicks, M. 2013. Chemical ecology and olfactory preferences of ovipositing Manduca sexta moths. *Journal of Chemical Ecology* 39:76-89. doi: 10.1007/s10886-012-0228-1
27. Byers, K.J., Sanders, E., **Riffell, J.A.** 2013. Identification of olfactory volatiles using gas chromatography-multi-unit recordings (GCMR) in the insect antennal lobe. *Journal of Visualized Experiments* e4381, doi:10.3791/4381.

**2012:**

26. Dacks, A.M., **Riffell, J.A.**, Martin, J.P., Gage, S.L., Nighorn, A. 2012. Olfactory modulation by dopamine in the context of aversive learning. *Journal of Neurophysiology* 108: 539-550. **[cover article]**
25. **Riffell, J.A.** 2012. Olfactory ecology and the processing of complex mixtures. *Current Opinion in Neurobiology* 22: 236-242, http://dx.doi.org/10.1016/j.conb.2012.02.013.

**2011:**

24. Martin, J.P., Beyerlein, A., Dacks, A.M., Reisenman, C.E., **Riffell, J.A.**, Lei, H., Hildebrand, J.G. 2011. The neurobiology of insect olfaction: Sensory processing in a comparative context. *Progress in Neurobiology*, 95: 427-447.
23. Agrawal, S., and **Riffell, J.A**. 2011. Behavioral neurobiology: the bitter life of male flies. *Current Biology*, 21, R470-R472.
22. **Riffell, J.A.**.. 2011. The neuroecology of a pollinator's buffet: olfactory preferences and learning in insect pollinators. *Integrative and Comparative Biology.* 51: 781-793.
21. **Riffell, J.A.*** and Zimmer, R.K. 2011. Extrinsic mechanisms driving sperm-egg interactions. *Proceedings of the National Academy of Sciences, USA*, 108: 13200-13205. *authors contributed equally

20. **Riffell, J.A.***, Veitinger, T.*, Zimmer, R.K., Hatt, H., Spehr, M. 2011. Chemosensory Ca2+ fingerprints define diverse behavioral phenotypes in human sperm. *Journal of Biological Chemistry*, 286: 17311-17325. *authors contributed equally

19. Himes, J., **Riffell, J.A.**, Zimmer, C.A., Zimmer, R.K. 2011. Sperm chemotaxis as revealed with live and synthetic eggs. *Biological Bulletin*, 220: 1-5.

**2010:**

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**2008:**

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9. **Riffell, J.A.**, Abrell, L., and Hildebrand J.G. 2008. Physical processes and real-time chemical measurement of the insect olfactory environment. *Journal of Chemical Ecology 34*: 837-853.

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7. **Riffell, J.A.,** Alarcón, R., and Abrell, L. 2008. Floral trait associations in hawkmoth-specialized and mixed pollination systems: *Datura wrightii* and *Agave* spp. in the Sonoran Desert. *Communicative & Integrative Biology 1*: 6-8.

**2007:**

6. **Riffell, J.A.** and Zimmer R.K. 2007. Sex and flow: the consequences of fluid shear for sperm–egg interactions. *Journal of Experimental Biology 210:* 3644-3660.

**2006:**

5. Spehr, M., Schwahn, K., **Riffell, J.A.**, Zimmer, R.K., and Hatt H. 2006. Odorant receptors and olfactory-like signaling mechanisms in mammalian sperm. *Molecular and Cellular Endocrinology 250(1-2)*: 128-136.

**2004:**

4. Spehr, M., Schwahn, K., **Riffell, J.A.**, Barbour, J., Zimmer, R.K., Neauhaus, E.M., and Hatt H. 2004. Olfactory receptor-mediated chemotaxis in human sperm: key role of particulate adenylate cyclase. *Journal of Biological Chemistry 279(40)*: 40194-40203.

3. **Riffell, J.A.**, Krug P.J., and Zimmer R.K. 2004. The ecological and evolutionary consequences of sperm chemoattraction. *Proceedings of the National Academy of Sciences, USA 101(13)*: 4501-4506.

**2003:**

2. Spehr, M., Gusselman G., Poplawski, A., **Riffell J.A.,** Zimmer R.K., and Hatt H. 2003. A novel testicular odor receptor controls human sperm chemotaxis. *Science 299*: 2054-2058.

**2002:**

1. **Riffell, J.A.**, Krug P.J., and Zimmer R.K. 2002. Fertilization in the sea: The chemical identity of an abalone sperm attractant. *Journal of Experimental Biology 205*: 1439-1450.

## ACADEMIC PRESENTATIONS (2020-present)

2026

- International Society of Chemical Ecology,NY (**invited**)
- International Congress of Neuroethology, BC Canada (**invited**)

2025

- Paul Allen Center workshop on climate change, WA (**invited**)
- Arizona State Univ., School of Lifescience, AZ (**invited**)
- Gordon Research Conference – Neuroethology, Italy (**invited**)
- European Chemoreception Research Organization, Spain **(invited)**

2024

- Workshop on Mosquito Control Methods, FL (**invited**)
- 2024 Arnold Plenary Lecture, Gonzaga University, WA (**invited**)
- International Congress of Neuroethology, Germany (**invited**)
- International Society for Olfaction and Taste, Iceland

- Kolymbari Meeting on Mosquitoes and Other Vectors of Disease (**invited**)
- Entomological Society of America, MD (**invited**)

2023

- Entomological Society of America, MD (**invited**)
- Gordon Research Conference – Neuroethology, VT (Poster)
- Bill and Melinda Gates Foundation – Decoding Olfaction Symposium (**invited**)
- Janelia Farm - Navigational Algorithms and Neural Circuit Computations Directing Olfactory Search Across Species (**invited**)
- Association for Chemoreception Sciences annual meeting, FL

2021/22

- International Symposium on Insect Olfaction Around the World (**invited**)
- The 6th Congress of the Latin American Association of Chemical Ecology (**invited**)
- Arizona State University Life Sciences / NeuroNex program (**invited**)

2020/21

- International Society for Olfaction and Taste (**invited**)
- Pacific Branch Entomological Society of America (**invited**)
- International Entomological Society (**invited**)
- University of Neva, Reno (**invited**)
- International Symposium on Molecular Insect Science, Melia Sitges, Spain (**invited**)

## UNIVERSITY OF WASHINGTON SERVICE AND ACTIVITIES (2020-present)

| | |
|---|---|
| Opportunities Committee, Chair | 2025-current |
| Faculty Senate | 2024-current |
| Biology Research Committee | 2023-current |
| Biology Grants Manager Hiring Committee | 2023/24 |
| Dept. Biol. Tenure Review Subcommittee | 2023-current |
| Office of Minorities Affairs, LSAMP member | 2022-current |
| RRF Reviewer | 2021-current |
| Reviewer for the Mary Gates URP | 2021-current |
| | |
| Integrative Physiology Faculty Search Committee | 2022-2023 |
| Undergraduate Curriculum Committee | 2020-2022 |
| Faculty Appointments Committee | 2019-2021 |

## EXTERNAL SERVICE AND ACTIVITIES (2020-present)

| | |
|---|---|
| Associate Editor for *Proceedings of the Royal Society B* | 2025-current |
| | |
| NIH-Chemosensation and Interoception Panel Member, ad hoc | 2026 |
| | |
| NIH-Vector Biology Panel Member | 2022-2025 |

Panel Member, NSF-IOS 2020-2022, 2025

*Ad-hoc* Reviewer, French National Research Agency (ANR) 2021, 2025

*Ad-hoc* Reviewer, United Kingdom BBRC 2025

*Ad-hoc* Reviewer, Belgium FNRS 2026

*Ad-hoc* Reviewer, Human Frontier in Science Program 2020, 2025

Reviewer, McArthur Foundation 2025, 2026

Promotion Reviewer/Letter writer (7 letters 2026)

*Ad-hoc* Reviewer, Austrian Research Agency (ANR) 2024

Program Chair Neurobiology Division of SICB 2016-2023

*Ad-hoc* Committee Member for NIH Study Section 2016, 2017, 2019, 2020

Associate Editor for *Frontiers in Behavioral Neuroscience* 2016-2021
Associate Editor for *Frontiers in Ecology and Evolution* 2013-2021

Grant Reviewer: National Science Foundation-IOS; US-Israel Binational Science Foundation (BSF); Rothamsted Research; NIH CSR TVZ and Neuroscience of Interoception and Chemosensation (NIC) panels; Netherlands Organization for Scientific Research (2016, 2017,2019,2020;2025); Austrian Science Fund (2016, 2017, 2024); Swiss National Science Foundation (2017, 2018,2019); French National Research Agency (ANR) (2013-2025); Human Frontiers in Science Program (2018, 2020, 2025); UK Biotechnology and Biological Sciences Research Council (2025).

Journal Reviewer (37 reviews in 2025): *Science; Nature, Nature Communications; PNAS; Current Biology; eLife; Science Advances; Cell Reports; Journal of Neuroscience; Proceedings of the Royal Society B; Philosophical Transactions of the Royal Society; Cell Reports; Journal of Neuroscience; Communications Biology; Journal of Experimental Biology; iScience; Insect Biochemistry and Molecular Biology; Journal of Comparative Neurology; Journal of Comparative Physiology A; Journal of Insect Physiology; Journal of Chemical Ecology; Open Biology – Proceedings of the Royal Society; PLoS Neglected Tropical Disease; Functional Ecology; Journal of Medical Entomology; Scientific Reports; Physiological Entomology*

Other Journal Reviews 2020-2023: *Nature Ecology and Evolution; BMC Biology; Journal of the Royal Society Interface; Biology Letters; New Phytologist; PLoS Computational Bioogy; PLoS Pathogens Comparative Biochemistry and Physiology - Part D; Malaria Journal; Trends in Parasitology; Biological Bulletin; Current Opinion in Insect Science.*

Science Outreach activities: 1) Seattle Expanding Your Horizons; (2) Paws on Science; (3) Brain Awareness Week; (4) Visits to the laboratory by elementary and middle schools kids during UW's Lab Day.

## MEDIA ATTENTION (2020-present)

- "WA scientists sniff out ways to repel mosquitoes" 2026. NPR, Fox, CBS, ScienceNews
- "Air pollution distracts insects from pollination and sex." 2026. National Geographic
- "Mosquitoes found in Iceland for the first time." 2025 NPR, Fox
- "Here's what makes you a prime target for mosquitoes" NPR, Fox, CNN
- "Polluted Flowers Smell Less Sweet to Pollinators, Study Finds" 2024. New York Times, New York Post, NPR National, BBC, National Geographic, Wired, Reuters, The Guardian, UW main page.
- "Mosquitoes are seeing red: Why new findings about their vision could help you hide from these disease vectors" 2022. CNN, New York Post, National Geographic, Wired, Reuters, The Guardian.
- "What If You Could Become Invisible to Mosquitoes?" 2021. CNN, People Magazine, New York Times.
- "Mosquitoes are drawn to flowers as much as people — and now scientists know why" 2020. CNN, Seattle Times, NPR

## TEACHING

As an Endowed Professor at the University of Washington, I have been fortunate to fulfill the dual role of educator and mentor. As an educator, I believe that teaching is a process where the instructor must ignite student interest and enthusiasm in the subject material. My experience as a mentor and faculty has demonstrated that students learn best in an environment conducive to intellectual development by fostering inquiry-based learning techniques. The goal is to promote critical thinking and an appreciation for the course. This can be accomplished by targeting 3 specific topics: (i) communication and participation, (ii) mentoring, and (iii) hands-on learning and student development. An important component of my teaching has been incorporating active learning components in the classroom. This has involved the development of research-intensive courses and the incorporation of laboratory modules in all my courses. These principles have proven useful for the undergraduate- and graduate-level courses I have taught over the last fifteen years.

Biology of Vector-borne Disease (course instructor) 2021-current

This course provides accessible, condensed training and "knowledge networking" for advanced graduate students, postdoctoral fellows, faculty and professionals to ensure competency in basic biology, current trends and developments, and practical knowledge for U.S. and global vector-borne diseases of plants, animals and humans. A 1-week course taught at the University of Idaho, the course is both lecture- and discussion-

based and is delivered by internationally recognized experts, with integrated case studies of emerging vector-borne pathogens to highlight parallels and key distinctions in biology across plant, animal and human vector-borne diseases.

Biology 428 “Sensory Neurophysiology & Ecology” 2010-current

Upper-division undergraduate laboratory course with 70-80 students on the current research in sensory ecology and neurophysiology. The course uses current literature to teach neuroscience and experimental sensory biology trends. For the Final, the students learn to write a research proposal in the NIH or NSF format, and how research proposals are reviewed. They perform the proposed experiments from their proposal and write up their results. These experiments tie in with the lecture material.

Biology 457 “Chemical Communication” 2010-current

70 student upper-division undergraduate course in the field of chemical ecology and behavior. A synthetic course, comprising material from Organic Chemistry, Sensory Neuroscience, to Community Ecology. Course innovations include the development of Discussion Section modules where the students conduct experiments and analyses using iPad apps, “smell tests”, and other in-class activities.

## MENTORING

Personnel mentored in Riffell Laboratory (2015-2026):

- 19 Postdoctorates (8 now in faculty positions; 2 in industry)
    - 12 Postdocs in 2021-2026
- Hosted 4 Sabbatical Members (Dr. Joe Langehans, Seattle Univ.; Dr. Walter Leal, UC Davis; Simon Sponberg, Georgia Tech Univ. (2025); Sawyer Fuller, Univ. Washington (2026)).
- 2 Research Scientists
- 12 Graduate students – currently supervising 4 graduate students
- 3 Neuroscience Rotation students
- 71 total undergraduate students mentored: 37 undergraduate students 2015/16; 16 undergraduate students in 2017; 12 undergraduate students in 2018; 11 in 2019; 11 in 2020; 2 in 2021; 6 in 2022; 8 in 2024
- 5 High School students
- 2 Staff Scientists
- Currently serving on 11 graduate student committees (8 at UW; 1 at Univ. Idaho; 2 at Duke University)