

# LAUREN A. O'CONNELL

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## EDUCATION AND PROFESSIONAL EXPERIENCE

Stanford University, Assistant Professor, Department of Biology	2017 - present
Harvard University, Bauer Fellow, FAS Center for Systems Biology	2012 - 2017
University of Texas at Austin, Ph.D. Cellular and Molecular Biology	2006 - 2011
Cornell University, B.S. Biological Sciences	2004 - 2006
Tarrant County College, A.A.	2002 - 2004

## FUNDING

National Science Foundation - Integrative Organismal Systems, \$1,200,000 "CAREER: From ecology to neurobiology: spatial cognition in rainforest frogs"	2019 - 2024
National Science Foundation - Integrative Organismal Systems, \$1,600,000 "EDGE: Enabling functional genomics tools in amphibians"	2018 - 2021
National Science Foundation - Integrative Organismal Systems, \$800,000 "Bioaccumulation mechanisms of defensive chemicals in a poison frog"	2016 - 2020
Hellman Faculty Scholar Award, \$40,000 "Dietary tuning of infant social communication"	2018 - 2019
National Geographic Society Committee for Research and Exploration, \$18,600 "Convergent Evolution of Maternal Care in Poison Frogs"	2015 - 2016

## HONORS AND FELLOWSHIPS

Kavli Fellow of the National Academy of Sciences	2019
Hellman Faculty Fellow	2018
Frank A. Beach New Investigator Award	2018
L'Oreal USA Changing the Face of STEM Mentorship Grant	2016, 2018
L'Oreal USA For Women in Science Fellowship	2015
Adele Lewis Grant Fellowship from Graduate Women in Science	2015
International Society for Neuroethology Konishi Neuroethology Research Award	2014
International Society for Neuroethology Capranica Prize	2013
International Society for Neuroethology Young Investigator Award	2012
Society for Social Neuroscience Early Career Award	2011
Society for Behavioral Neuroendocrinology Young Investigator Award	2011
UT-Austin William S. Livingston Outstanding Graduate Student Award	2011
International Society for Neuroethology Heiligenberg Student Travel Award	2010, 2011
UT-Austin Professional Development Award	2010
Society for Behavioral Neuroendocrinology Student Travel Award	2010
TCC Natural Science Department Award of Excellence	2003, 2004

## SUBMITTED MANUSCRIPTS

1. Nowicki J, Pratchett M, Walker S, Coker D, **O'Connell LA**. Neurobiology of pair bonding in fishes: convergence of neural mechanisms in distant vertebrate lineages. *bioRxiv preprint*. doi: 10.1101/214759

## ORIGINAL RESEARCH PUBLICATIONS (\*co-first authorship)

1. Lynch KS, **O'Connell LA**, Balakrishnan CN, Lauder MI, Fischer EK. Understanding the loss of maternal care in avian brood parasites using preoptic area transcriptome comparisons in brood parasitic and non-parasitic blackbirds. *G3-Genes Genome Genet*. In press.
2. Young RL, Ferkin MH, Ockendon-Powell NF, Orr VN, Phelps SM, Pogány A, Richards-Zawacki CL, Summers K, Székely T, Trainor BC, Urrutia AR, Zachar G, **O'Connell LA**, Hofmann HA. 2019. Conserved transcriptomic profiles underpin monogamy across vertebrates. *PNAS*. 116:1331-6. doi: 10.1073/pnas.1813775116
3. Moskowitz NA, Roland AB, Fischer EK, Ranaivorazo N, Vidoudez C, Aguilar MT, Caldera SM, Chae J, Cristus MG, Crowdis JP, DeMessie B, Desjardins-Park CR, Effenberger AH, Flores F, Giles M, He EY, Izmaylov NK, Lee CC, Pagel NA, Phu KK, Rosen LU, Seda DA, Shen Y, Vargas S, Weiss HS, Murray AW, Abebe E, Trauger SA, Donoso DA, Vences M, **O'Connell LA**. 2018. Seasonal changes in diet and

chemical defense in the Climbing Mantella frog (*Mantella laevigata*). PLoS ONE 13(12): e0207940. doi: /10.1371/journal.pone.0207940

4. Kapp FG, Perlin JR, Hagedorn EJ, Gansner JM, Schwarz DE, **O'Connell LA**, Johnson NS, Amemiya C, Fisher DE, Wolfle U, Trompouki E, Miemeyer CM, Driever W, Zon LI. 2018. Protection from UV light is an evolutionary conserved feature of the hematopoietic niche. *Nature*. 558:445-448. doi: 10.1038/s41586-018-0213-0
5. Nowicki J, **O'Connell LA**, Cowman PF, Walker S, Coker D, Pratchett M. 2018. Variation in social systems within *Chaetodon* butterflyfishes, with special reference to pair bonding. PLoS One. 13:e0194465 doi: 10.1371/journal.pone.0194465
6. Santos JC, Tarvin RD, **O'Connell LA**, Blackburn DC, Coloma LA. 2018. Diversity within Diversity: Parasite species richness in poison frogs assessed by transcriptomics. *Mol Phylogenet Evol*. 125:40-50. doi: 10.1016/j.ympev.2018.03.015
7. Audet JN, Kayello L, Ducatez S, Perillo S, Cauchard L, Howard JT, **O'Connell LA**, Jarvis ED, Lefebvre L. 2018. Divergence in problem-solving skills associated with differential expression of glutamate receptors in wild finches. *Science Advances*. 4:eaa06469. doi: 10.1126/sciadv.aao6369
8. Roland AB, Santos JC, Carriker BC, Caty SN, Tapia EE, Coloma LA, **O'Connell LA**. 2017. Radiation of the polymorphic Little Devil poison frog (*Oophaga sylvatica*) in Ecuador. *Ecol Evol*. 7:9750-9762. doi: 10.1002/ece3.3503
9. Tarvin RD, Borghese CM, Sachs W, Santos JC, Lu Y, **O'Connell LA**, Cannatella DC, Harris RA, Zakon HH. 2017. Interacting amino acid replacements allow poison frogs to evolve epibatidine resistance. *Science*. 357:1261-1266. doi: 10.1126/science.aan5061
10. Stynoski JL, **O'Connell LA**. 2017. Developmental morphology of granular skin glands in egg-eating poison frog tadpoles. *Zoomorphology* 136:219-24. doi: 10.1007/s00435-017-0344-0
11. Rabeling C, Sosa-Calvo J, **O'Connell LA**, Coloma LA, Fernández F. 2016. *Lenomyrmex hoelldobleri*: a new ant species discovered in the stomach of the dendrobatid poison frog, *Oophaga sylvatica* (Funkhouser). *Zookeys* 618:79-95. doi: 10.3897/zookeys.618.9692
12. McGugan JR\*, Byrd GD\*, Roland AB, Caty SN, Kabir N, Tapia EE, Trauger SA, Coloma LA, **O'Connell LA**. 2016. Ant and mite diversity drives toxin variation in the Little Devil poison frog. *J Chem Ecol*. 42:537-551. doi: 10.1007/s10886-016-0715-x
13. Tarvin RD, Santos JC, **O'Connell LA**, Zakon HH, Cannatella DC. 2016. Convergent substitutions in a sodium channel suggest multiple origins of toxin resistance in poison frogs. *Mol Biol Evol*. 33:1068-1081. doi: 10.1093/molbev/msv350
14. Ockendon NF, **O'Connell LA**, Bush SJ, Monzon-Sandoval J, Barnes H, Székely T, Hofmann HA, Dorus S, Urrutia AO. 2015. Optimisation of next generation sequencing transcriptome annotation for species lacking sequenced genomes. *Mol Ecol Resour*. 16:446-458. doi: 10.1111/1755-0998
15. Simões JM, Barata EN, Harris RM, **O'Connell LA**, Hofmann HA, Oliveira RF. 2015. Social odors conveying dominance and reproductive information induce rapid physiological and neuromolecular changes in a cichlid fish. *BMC Genomics*. 16:114. doi: 10.1186/s12864-015-1255-4
16. **O'Connell LA**, Ding JH, Hofmann HA. 2013. Differences and similarities between males and females in neuroendocrine regulation of social behavior. *Horm Behav* 64: 468-476. doi: 10.1016/j.yhbeh.2013.07.003
17. Kidd MR, Dijkstra PD, Alcott C, Lavee D, Ma J, **O'Connell LA**, Hofmann HA. 2013. Prostaglandin F2 $\alpha$  facilitates female mating decisions based on male performance. *Behav Ecol Sociobiol* 67:1307-1315. doi: 10.1007/s00265-013-1559-9
18. **O'Connell LA**\*, Rigney MM\*, Dykstra DW, Hofmann HA. 2013. Neuroendocrine mechanisms underlying sensory integration of social signals. *J Neuroendocrinol*, 25:644-654. doi: 10.1111/jne.12045
19. Huffman LS, **O'Connell LA**, Hofmann HA. 2013. Aromatase promotes aggression in the African cichlid fish *Astatotilapia burtoni*. *Physiol Behav* 122-113:77-83. doi: 10.1016/j.physbeh.2013.02.004
20. **O'Connell LA**\*, Fontenot MR\*, Hofmann HA. 2013. Neurochemical profiling of dopamine neurons in a cichlid fish, *Astatotilapia burtoni*. *J Chem Neuroanat* 47:106-115. doi: 10.1016/j.jchemneu.2012.12.007
21. Kidd MR\*, **O'Connell LA**\*, Kidd CE, Chen CW, Fontenot MR, Williams SJ, Hofmann HA. 2013. Female preference for males depends on reproductive physiology in the African cichlid fish *Astatotilapia burtoni*. *Gen Comp Endocrinol*, 180:56-63. doi: 10.1016/j.ygcen.2012.10.014
22. **O'Connell LA**, Mitchell MM, Hofmann HA, Crews D. 2012. Androgens coordinate neurotransmitter-related gene expression in male whiptail lizards. *Genes Brain Behav* 11:813-818. doi: 10.1111/j.1601-183X.2012.00828.x

23. Huffman LS\*, **O'Connell LA\***, Kenkel CD, Kline RJ, Khan IA, Hofmann HA. 2012. Distribution of nonapeptide systems in the forebrain of an African cichlid fish, *Astatotilapia burtoni*. J Chem Neuroanat 44:86-97. doi: 10.1016/j.jchemneu.2012.05.002
24. **O'Connell LA**, Hofmann HA. 2012. Evolution of a vertebrate social decision-making network. Science 336:1154-1157. doi: 10.1126/science.1218889
25. **O'Connell LA\***, Matthews BJ\*, Hofmann HA. 2012. Isotocin regulates paternal care in a monogamous cichlid fish. Horm Behav 61:725-733. doi: 10.1016/j.yhbeh.2012.03.009
26. Huffman LS, Mitchell MM, **O'Connell LA**, Hofmann HA. 2012. Rising StARs: Behavioral, hormonal, and molecular responses to social challenge and opportunity. Horm Behav 61:631-641. doi: 10.1016/j.yhbeh.2012.02.016
27. **O'Connell LA**, Hofmann HA. 2012. Social status predicts how sex steroid receptors regulate complex behavior across levels of biological organization. Endocrinology 153:1341-1351. doi: 10.1210/en.2011-1663
28. Kline R, **O'Connell LA**, Hofmann HA, Holt GJ, Khan IA. 2011. The distribution of an AVT V1a receptor in the brain of a sex changing fish. *Epinephelus adscensionis*. J Chem Neuroanat 42:72-88. doi: 10.1016/j.jchemneu.2011.06.005
29. **O'Connell LA**, Ding JH, Ryan MJ, Hofmann HA. 2011. Neural distribution of the nuclear progesterone receptor in the túngara frog, *Physalaemus pustulosus*. J Chem Neuroanat 41:137-147. doi: 10.1016/j.jchemneu.2011.01.002
30. **O'Connell LA**, Matthews BJ, Patel SB, O'Connell JD, Crews D. 2011. Molecular characterization and brain distribution of the progesterone receptor in whiptail lizards. Gen Comp Endocrinol 171:64-74. doi: 10.1016/j.ygcen.2010.12.010
31. **O'Connell LA**, Matthews BJ, Crews D. 2011. Neuronal nitric oxide synthase as a substrate for the evolution of pseudosexual behavior in a parthenogenetic whiptail lizard. J Neuroendocrinol 23:244-253. doi: 10.1111/j.1365-2826.2010.02099.x
32. **O'Connell LA**, Fontenot MR, Hofmann HA. 2011. Distribution of the dopaminergic system in the African cichlid fish, *Astatotilapia burtoni*. J Comp Neurol 519:72-92. doi: 10.1002/cne.22506
33. **O'Connell LA**, Matthews BJ, Ryan MJ, Hofmann HA. 2010. Characterization of the dopaminergic system in the túngara frog, *Physalaemus pustulosus*. Brain Behav Evol 76:211-225. doi: 10.1159/000321715
34. **Munchrath LA**, Hofmann HA. 2010. Distribution of steroid hormone receptors in the African cichlid fish, *Astatotilapia burtoni*. J Comp Neurol 518:3302-3326. doi: 10.1002/cne.22401

#### REVIEWS AND BOOK CHAPTERS

1. Fischer EK, Nowicki JP, **O'Connell LA**. 2019. Evolution of Affiliation: patterns of convergence from genomes to behaviour. Phil Trans R Soc B. *in press*.
2. Fischer EK, **O'Connell LA**. 2018. Circuit architecture underlying distinct components of parental care. Trends Neurosci. 41:334-336. doi: 10.1016/j.tins.2018.04.003
3. Fischer EK, **O'Connell LA**. 2017. Modification of feeding circuits in the evolution of social behavior. J Exp Biol. 220:92-102. doi:10.1242/jeb.143859
4. Santos JC, Tarvin RD, **O'Connell LA**. 2016. A review of chemical defense in poison frogs (Dendrobatidae): Ecology, pharmacokinetics, and autoresistance. In: Chemical Signals in Vertebrates. Vol 13. Switzerland: Springer International Publishing. pp. 305-337. doi: 10.1007/978-3-319-22026-0\_21
5. Roland AB, **O'Connell LA**. 2015. Poison frogs as a model system for studying the neurobiology of parental care. Curr Opin Behav Sci. 6:76-81. doi: 10.1016/j.cobeha.2015.10.002
6. Dulac C, **O'Connell LA**, Wu Z. 2014. Neural Control of Maternal and Paternal Behaviors. Science. 345:765-770. doi: 10.1126/science.1253291
7. **O'Connell LA**. 2013. Evolutionary development of neural systems in vertebrates and beyond. J Neurogenet 27:69-85. doi: 10.3109/01677063.2013.789511
8. **O'Connell LA**, Hofmann HA. 2011. The vertebrate mesolimbic reward system and social behavior network: A comparative synthesis. J Comp Neurol 519:3599-3639. doi: 10.1002/cne.22735
9. **O'Connell LA**, Hofmann HA. 2011. Genes, hormones, and circuits: An integrative approach to study the evolution of social behavior. Front Neuroendocrinol 32:320-335. doi: 10.1016/j.yfrne.2010.12.004

#### INVITED CONFERENCE TALKS (\*Plenary/Keynote)

1. National Academy of Sciences, Kavli Frontiers of Science, Irvine, CA. February 2019.
2. \*International Society for Neuroethology, 13<sup>th</sup> Congress. Brisbane, Australia. July 2018.
3. Society for Molecular Biology and Evolution. Texas, USA. July 2017.

4. Society for Behavioral Neuroendocrinology, 21<sup>st</sup> Annual Meeting, California, USA. June 2017.
5. \*Animal Behavior Society, 53<sup>rd</sup> Annual Conference, Missouri, USA. July 2016.
6. International Society for Neuroethology, 11<sup>th</sup> Congress. Sapporo, Japan. August 2014.
7. North American Society for Comparative Endocrinology. Querétaro, Mexico. May 2013.
8. Center for Studies in Behavioral Neurobiology. Montreal, Canada. November 2012.
9. International Society for Neuroethology, 10<sup>th</sup> Congress. Maryland, USA. August 2012.
10. Society for Social Neuroscience. Washington D.C., USA. November 2011.
11. International Society for Neuroethology, 9<sup>th</sup> Congress. Salamanca, Spain. August 2010.

#### **INVITED SEMINARS** (\*invitation by graduate students)

1. Department of Biology, San Francisco State University, San Francisco, USA. April 2019.
2. \*Department of Molecular and Cell Biology, University of California, Berkeley, USA. March 2019.
3. \*Department of Ecology & Evolution, Princeton University. Princeton, USA. December 2018.
4. Department of Biology, University of Utah. Salt Lake City, USA. September 2018.
5. \*Department of Biology, University of Massachusetts – Amherst. Amherst, USA. March 2018.
6. Department of Biological Sciences, Chapman University. Orange, USA. November 2017.
7. \*Department of Biology, Kansas State University. Manhattan, USA. December 2016.
8. \*Department of Ecology and Evolution, University of Chicago. Chicago, USA. September 2016.
9. Department of Neurobiology and Behavior, Cornell University. Ithaca, USA. September 2016.
10. Department of Biology, University of North Carolina - Chapel Hill. Chapel Hill USA. September 2015.
11. \*Department of Genetics, North Carolina State University. Raleigh, USA. November 2014.
12. Department of Biomedical Sciences, University of New Hampshire. Durham, USA. October 2014.
13. \*School of Integrative Biology, University of Illinois Urbana-Champaign. Urbana, USA. October 2014.
14. Grass Foundation, Marine Biological Laboratories. Woods Hole, USA. June 2014.
15. Department of Integrative Biology, University of Texas at Austin. Austin, TX. May 2014.
16. Lewis-Sigler Institute of Integrative Genomics, Princeton University. New Jersey, USA. April 2014.
17. Department of Biology, Columbia University. New York, USA. March 2014.
18. Department of Biology, East Carolina University. Greenville, USA. October 2013.
19. Department of Ecology, Behavior, and Evolution, Boston University. Boston, USA. December 2012.
20. Department of Biology, McGill University. Montreal, Canada. November 2012.

#### **TEACHING EXPERIENCE**

<i>Stanford University:</i>	How Does Your Brain Work?	Autumn quarter, annual
<i>South America:</i>	Bioinformatics	annual workshop
<i>Harvard University:</i>	Integrated Science	Spring 2016

#### **PROFESSIONAL MEMBERSHIPS**

Animal Behavior Society, International Society for Neuroethology, JB Johnston Club for Evolutionary Neuroscience, Society for Behavioral Neuroendocrinology, Society for Neuroscience, Society for Social Neuroscience, Society for the Study of Evolution

#### **OTHER PROFESSIONAL ACTIVITIES**

*Editorial Boards:* Ecology and Evolution (2013-2017)

*Symposium Organizer/Chair:*

1. Evolution of parental behavior. International Society for Neuroethology, 11<sup>th</sup> Congress. July 2014. Sapporo, Japan.
2. Evolution of gene networks in neural structures. Neuroethology Gordon Research Conference. August 2013. West Dover, Vermont, USA.
3. Phenotypic transmission through social networks. Society for Social Neuroscience. October 2012. New Orleans, Louisiana, USA.

*Peer Reviewer:* Animal Behaviour, Behavioral Brain Research, Behavioral Ecology and Sociobiology, Biology Letters, Brain Behavior & Evolution, Comparative Biochemistry and Physiology, General and Comparative Endocrinology, Evolution Letters, Hormones and Behavior, Insect Science, Journal of Chemical Neuroanatomy, Molecular Ecology, Neuroscience Letters, Physiology and Behavior, PLoS Computational Biology, PLoS ONE, Proceedings of the Royal Society B, Science, Scientific Reports

*Postdoctoral Mentorship:* Jesse Delia (2018-present), Eva K. Fischer (2015-present, NSF postdoctoral fellowship), Jessica Nowicki (2016-present), Andrius Pasukonis (2016-present, Erwin Schrödinger

postdoctoral fellowship), Alexandre-Benoit Roland (2013-2017), Devraj Singh (2016-2017, co-advised with Prof. Scott Edwards).

*Research Supervisor/Mentor: (U – undergraduate; HS – high school)*

Stanford University: Harmony Alvarez (U), Maximiliana Bogan (U), Aditya Iyer (U), Alexis Levit (U), Camille Lin (U), Helen Nguyen (HS), Travis Ramirez (U), Lizbeth Rios-Camacho (HS), Jules Wyman (U)

Harvard University: Mia Bertalan (U), Alexis Bonilla (HS), Bella Carriker (HS), Stephanie Caty (U), Siyuan Chen (U), Puja Dutta (HS), Kevin Eappen (HS), Gwen Ellis (HS), Mary Erb (HS), Benjamin Glauser (U), Narinka Guichette (HS), Jenni Haydek (U), Rebecca Hickey (HS), Nisha Kabir (HS), Prapti Koirala (HS), Tessa Lewis (HS), Monica Lin (U), Chloe Marsanne (HS), Jenna McGugan (U), Jason Millington (U), Javon Mullings (U), Rio Nelson-Marx (HS), Olivia Nieves (HS), Julie Ortiz (U), Bijan Rosen (HS), Jonah Simon (HS), Mahbooba Tamanna (HS).