

## CURRICULUM VITAE

**Laura L. Carruth**  
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### Contact Information:

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### Education:

Doctor of Philosophy, The University of Colorado at Boulder September 1992-August 1998  
research advisors: Dr. Richard E. Jones and Dr. David Norris  
Master of Arts, The University of Colorado at Boulder, December 1994  
research advisors: Dr. Richard E. Jones and Dr. Alexander Cruz  
Bachelor of Arts, The University of Colorado at Boulder, Major: Environmental, Organismic and  
Population Biology, May 1990  
Molecular neurobiology class, Friday Harbor Laboratory, University of Washington, Spring 1995.

### Research Experience:

Director of the Center for Instructional Effectiveness, GSU Nov. 2014- current.  
Faculty Associate for Graduate Studies, GSU College of Arts & Sciences, Jan. – May 2014.  
Director of Neuroscience Dual Degree BS/MS program, August 2014 – current.  
Director of Graduate Studies, Neuroscience PhD Program, Georgia State University, August 2011-  
August 2014.  
Associate Professor, Georgia State University, Neuroscience Institute. August 2009-current.  
Assistant Professor, Georgia State University Department of Biology. August 2002-2009.  
Science Education: Co-Chair of the Precollege and Public Education Committee at the Center for  
Behavioral Neuroscience and Georgia State University, August 2004-present  
Postdoctoral researcher: Depts. of Physiological Science and Neurobiology, UCLA, under guidance of  
Dr. Arthur P. Arnold. 7/1/98 – 6/30/02. “Genetic Determinants of Brain Sexual  
Differentiation”.  
Colorado Division of Wildlife Research Collections. Colorado River, Colorado. Fall 1993-97.  
Graduate Research Assistant: The University of Colorado, Boulder, Colorado; on NIH grant awarded  
to Dr. Harriet Austin from 7/96-8/96. Mullerian duct regression in alligator embryos.  
Graduate Research Assistant: The University of Colorado, Boulder, Colorado; on NIH grant awarded  
to Dr. Richard E. Jones from 8/92- 8/93. Control of ovarian alternation: brain studies.  
Graduate Research Assistant: The University of Colorado, Boulder, Colorado; on NSF grant awarded  
to Dr. Richard E. Jones and Dr. David O. Norris from 6/97-8/97. Stress and aging of the  
Pacific salmon brain.  
Undergraduate Assistant to the Zoology Curator: The University of Colorado, Boulder, Colorado; Jan.  
1988-May 1990.

### Publications:

*Theses:*

M.A. Thesis: **Carruth, LL**, 1994. Verification that the checkerboard cichlid, *Crenicara punctulata*, is  
a protogynous hermaphrodite: behavioral analysis and gonadal histology.

Doctoral thesis: **Carruth, LL**, 1998. The Effects of Cortisol on Glucocorticoid Receptor Immunoreactivity in the Brain of Kokanee Salmon (*Oncorhynchus nerka kennerlyi*), with an Emphasis on Olfactory and Memory Regions.

*Published:*

- Pecore, J.L., M.K. Demetrikopoulos, & L.L. Carruth. 2014. What middle school teachers want and what teachers desire in a middle school summer science camp. Proceedings of the Association for Science Teacher Education. In Press.
- Shahbazi, M., Jimenez, P., Martinez, L., & **L.L. Carruth**. 2014. Effects of housing condition and early corticosterone treatment on learned features of song in adult male zebra finches. *Horm. Behav.* 65: 226-237.
- Pecore, J.L., Kirchgessner, M.L. & **L.L. Carruth**. 2013. Changes in science content knowledge and attitudes toward science teaching of educators attending a zoo-based neuroscience professional development workshop. *The Clearing House: A journal of educational strategies, issues and ideas.* 86: 238-245.
- Britner, S.L., Williams, B.A., Pecore, J.L., Gagne, P., Demetrikopoulos, M.K., Poh, R., **Carruth, L.L.**, Goode, C.T., DeHaan, R.L., & K.J. Frantz. 2012. Portraits of science self-efficacy: Four undergraduate women in a summer research experience. *Journal of Women and Minorities in Science and Engineering*, 18:273-293. DOI: 10.1615/JWomenMinorScienEng.2013004491
- Paisley, J.C., Huddleston, G.G., **Carruth, L.L.**, Petrusis, A., Grober, M.S., & A.N. Clancy. 2012. Sexual responses of the male rat medial preoptic area and medial amygdala to estrogen: site specific reduction of estrogen receptor alpha. *Horm Behav.* 62(1):50-7.
- Shahbazi, M., Schmidt, M., & **L.L. Carruth**. 2011. Distribution and subcellular localization of glucocorticoid receptor-immunoreactive neurons in the developing and adult male zebra finch brain. *Gen. Comp. Endocrinol.*, 174, 354-361.
- Duncan K.A. & **L.L. Carruth**. 2011. The song remains the same: coactivators and sex differences in the songbird brain. *Front. Neuroendocrinol.* 32: 84-94.
- Duncan, K.A., Jimenez, P., & **L.L. Carruth**. 2011. Distribution and sexually dimorphic expression of steroid receptor coactivator-1 (SRC-1) in the zebra finch brain. *Gen. Comp. Endocrinol.* 170: 408-414.
- Duncan, K.A., Jimenez, P. & **L.L. Carruth**. 2009. The selective estrogen receptor alpha coactivator, RPL7, and sexual differentiation of the songbird brain. *Psychoneuroendocrinology*, 34: S30-38.
- Nehm, R.H., Poole, T.M., Hoskins, S., Lyford, M.E., **Carruth, L.**, Ewers, B.E. & P.J.S Colberg. 2009. Curricular segregation of evolution: its role in students' cognitive models of biology and their rejection of evolution. *Evo.: Edu. and Outreach*, 2009 2(3): 527-532.
- Duncan, K.A. & **L.L. Carruth**. 2007. Sexually dimorphic expression of L7/SPA, an estrogen receptor coactivator, in the developing zebra finch brain. *Develop. Neurobiol.* 67(14): 1852-1866.
- Demetrikopolous, M.K., Pecore, J., Rose, J.D. & **L. Carruth**. 2006. Build a Brain Project: Students Design and Model the Brain of an Imaginary Animal. *Science Scope*, Summer 2006: 28-31.
- Frantz, K.J., DeHaan, R.L., Demetrikopolous, M.K. & **L.L. Carruth**. 2006. Routes to Research for Novice Undergraduate Neuroscientists. *Cell Biology Education* 5(2): 175-187.

- Zardetto-Smith, A., Mu, K., **Carruth, L.L.**, & K.J. Frantz. 2006. Brains Rule!: A Model Program for Developing Professional Stewardship Among Neuroscientists. *Cell Biology Education*. 5(2): 158-166.
- Paisley, J.C., Huddleston, G.G., Denman, H.N. **Carruth, L.L.**, Grober, M.S. Grober, and A.N. Clancy. 2005. Inhibition of estrogen receptor synthesis in the medial preoptic area, but not the medial amygdala, reduces male rat mating behavior. *Horm Behav*. 48(1): 94-100.
- Demetrikopoulos, M.K., Parlier, D., Caldwell, H.K., Rose, J.D., Frantz, K.J., & **L. Carruth**. 2004. Developing Flexible Professional Development Opportunities to Meet Diverse Teacher Needs. *Science Scope*, 27(5): 16-19.
- Carruth, L.L.**, Reisert, I., & A.P. Arnold. 2002. Sexual Differentiation of the brain *in vitro*: direct effects of sex chromosome genes. *Nature Neuroscience*, 5: 933-934.
- Carruth, L.L.**, Jones, R.E., & D.O. Norris. 2002. Stress and Pacific Salmon: a new look at the role of cortisol in olfaction and home-stream migration. *Integrative and Comparative Biology* 42(3): 574-581.
- Carruth, L.L.**, Jones, R.E. & D.O. Norris. 2000. Cell density and intracellular translocation of glucocorticoid receptor immunoreactive neurons in the kokanee salmon (*Oncorhynchus nerka kennerlyi*) brain, with an emphasis on the olfactory system. *Gen. Comp. Endocrinol.* 117: 66-76.
- Carruth, L.L.**, Dores, R.M., Maldonado, T.A., Norris, D.O., Ruth, T. & R.E. Jones. 2000. Elevation of plasma cortisol during the spawning migration of landlocked kokanee salmon (*Oncorhynchus nerka kennerlyi*). *Comparative Biochemistry and Physiology Part C*. 127: 123-131.
- Carruth, L.L.** 2000. Freshwater cichlid, *Crenicara punctulata*, is a protogynous sequential hermaphrodite, *Copeia*. 00(1): 71-82.
- Invited Chapters:**
- Carruth, L.L.** and M. Shahbazi. 2015. Estrogen Actions in the Brain. In K. Duncan ed., *Estrogens Effects on Traumatic Brain Injury*. Elsevier Press, Oxford, UK, pp. 11-28.
- Goode, C.T., Britner, S.L., Gagne, P., Pecore, J.L., Demetrikopoulos, M.K., Williams, B.A., **Carruth, L.L.**, DeHaan, R.L., and K.J. Frantz. 2012. Scientific Research Self-efficacy Among Undergraduates: Current Contexts and Approaches for Measurement. In SL Britner ed., *Self-Efficacy in School and Community Settings*. Nova Science Publisher, New York, pp. 21-52.
- Arnold, A.P., Agate, R.J. and **Carruth, L. L.** 2004. Hormonal and Nonhormonal Mechanisms of Sexual differentiation of the Brain. In MJ Legato ed., *Principles of Gender Specific Medicine*. Elsevier, London, pp. 84-95.
- Arnold, A.P., R Agate, **LL Carruth**, M Patel, W Perlman, B Ramachandran, and J Xu. 2002. Do sex chromosomal genes directly induce sexually dimorphic neural development? In R Handa, S Hayashi, E Terasawa, and M Kawata, eds., *Neuroplasticity, Development & Steroid Hormone Action*. CRC Press, pp. 305-321.

### **Under Review, Revision or In Preparation:**

- Shahbazi, M. and **L.L. Carruth**, 2014. Early corticosterone treatment differentially affects HVC size in the juvenile and adult zebra finch brain. Under review as of Dec. 2014. *Journal of Comparative Neurology*.
- Pecore, J.L., Demetrikopoulos, M.K., Frantz, K.J., Kirchgessner, M.L. and **L.L. Carruth**. 2014. Formal lessons improve informal education experiences: influence of cognitive novelty on student engagement. Under revision as of November 2014 at *Visitor Studies*.
- Duncan, K.A., Jimenez, P. and **L.L. Carruth**. 2014. Selective estrogen receptor-alpha coactivator RPL7 protein expression knockdown using antisense oligonucleotides alters neuron number in the zebra finch (*Taeniopygia gutta*) song nuclei. Under revision, *Biology Letters*.
- Duncan, K.A. and **L.L. Carruth**. 2014. Sex differences in neuronal survival following knockdown of selective estrogen receptor coactivator RPL7 in the zebra finch brain. Under revision.

### **Invited Symposium:**

- University of Memphis, Department of Biology. September 26, 2013. "Does the song remain the same? Hormone actions and developmental plasticity in the zebra finch brain".
- Behaviour 2013, Newcastle-Gateshead, UK. August 7, 2013. "Singing and the Stressed Brain".
- University of Southern Mississippi, Department of Biological Sciences. March 22, 2013. "Developmental plasticity and the songbird brain".
- Auburn University, Department of Biological Sciences. Oct. 26, 2012. "Does the song remain the same? Hormones and developmental plasticity in the zebra finch song control system".
- 10<sup>th</sup> International Symposium on Avian Endocrinology. Gifu, Japan, June 5-9, 2012. "Developmental plasticity and the zebra finch song control system".
- Frontiers in Neuroscience Series, Emory University, Nov. 18, 2011. "Singing and the Brain: Hormones, Coactivators, and the Avian Song Control System"
- Department of Biology, Duquesne University, Sept. 30, 2011, "Singing and the Brain: Hormones, Coactivators, and the Avian Song Control System"
- Steroids and the Nervous System Conference, Turin, Italy. The Estrogen Receptor Alpha Coactivator, RPL7, and Sexual Differentiation of the Songbird Brain, Feb. 16, 2009.
- Symposium on Contemporary Approaches to Endocrine Signaling. Society for Integrative and Comparative Biology (SICB) Toronto SICB meeting Jan 5-6th, 2003. Talk title: Sex differences in the songbird brain: using molecular tools to investigate brain sexual differentiation in a comparative model.
- Sexual Differentiation of the Songbird Brain, Neuroscience at GSU, Retreat Presentation, Indian Creek Lodge, Atlanta. Oct. 5, 2002.
- Glucocorticoid receptor function in the Pacific salmon brain: An adaptive role for cortisol on olfaction and memory recall. April 2001. Presented at the 2001 Workshop on Steroid Hormones and Brain Function, Breckenridge, CO.
- Symposium on Stress - Is it more than a Disease? A Comparative Look at Stress and Adaptation. Society for Integrative and Comparative Biology (SICB) Chicago SICB meeting Jan 5-6th, 2001. Talk title: Stress and Pacific Salmon: A New Look at the Role of Cortisol in Olfaction and Home-Stream Migration.

### **Presentations at Scientific and/or Education Meetings:**

- Pecore, JL, MK Demetrikopoulos, and LL Carruth, L. L. 2015. What middle school teachers want and what teachers desire in a middle school summer science camp. Association for Science Teacher Education Annual Conference. Portland, OR. January 7-10, 2015.
- Pecore, JL, ML Kirchgessner, and LL Carruth. 2014. Possibilities of informal settings to impact science educators through unique collaborative professional development. Association for Science Teacher Education Annual Conference. San Antonio, TX. January 15-18, 2014.
- Carruth, LL and M Shahbazi. 2013. Early Developmental Stress Alters HVC but not RA size in Male Zebra Finches. Society for Integrative and Comparative Biology Conference, Jan. 3-7, 2013, San Francisco, CA.
- Britner, SL, PE Gagne, MK Demetrikopoulos, KL Falkenberg, JL Pecore, BA Williams, LL Carruth, CT Goode, RL DeHaan, and KJ Frantz. 2010. Effects of a collaborative learning model vs. a traditional apprenticeship model on undergraduate student self-efficacy and achievement during a summer research experience. Presented at the meeting of the National Association for Research in Science Teaching, Philadelphia, PA, March 2010.
- Demetrikopoulos, MK, JL Pecore, SL Britner, LL Carruth, RL DeHaan, KL Falkenberg, PE Gagne, CT Goode, BA Williams, and KJ Frantz. 2009. Comparing Collaborative Research and Apprenticeship Models in Designing Undergraduate Summer Programs. Third Annual Conference on Understanding Interventions that Broaden Participation in Research Careers, Bethesda, MD, May 2009.
- Carruth, LL, B Ramachandran, and AP Arnold. 2003. Sex Differences in steroid receptor coactivator expression in the hatchling zebra finch brain. Western Regional Comparative Endocrinology Meeting. Boulder, Colorado.
- Carruth, LL, RE Jones, and DO Norris. 1998. Exogenous cortisol influences glucocorticoid receptor (GR)-immunoreactivity in the sexually immature kokanee salmon (*Oncorhynchus nerka kannerlyi*) brain. Society of Comparative and Integrative Biology Annual Meeting. Denver, Colorado.
- Carruth, LL, RE Jones, DO Norris, and RL Spencer. 1997. Cell Density and Intracellular Transcription of Glucocorticoid Receptor Immunoreactive Neurons in the Salmon Brain, with an Emphasis on the Olfactory System. Western and Southwestern Regional Comparative Endocrinology Meeting. Denver, Colorado.
- Carruth, LL, RE Jones, and DO Norris. 1996. Distribution of glucocorticoid receptor immunoreactive neurons in the brain of sexually immature and spawning female kokanee salmon. Society of Comparative and Integrative Biology Annual Meeting. Albuquerque, New Mexico.
- Carruth, LL, RE Jones, and DO Norris. 1996. Distribution of glucocorticoid receptor immunoreactive neurons in the brain of sexually immature and spawning female kokanee salmon. Western Regional Comparative Endocrinology Meeting. Berkeley, California.
- Carruth, LL. 1995. Verification that the checkerboard cichlid, *Crenicara punctulata*, is a protogynous hermaphrodite: using behavioral analysis and gonadal histology. Regional Animal Physiology Conference. Boulder, Colorado.

Carruth, LL. 1994. Verification that the checkerboard cichlid, *Crenicara punctulata*, is a protogynous hermaphrodite. Western Regional Comparative Endocrinology Meeting. San Diego, California.

**Abstracts and Poster Presentations:**

Cheesman, SC, M Shahbazi, and **LL Carruth**. 2015. Early developmental stress reduces neuron number in HVC but not RA in the male zebra finch song control system. Society for Integrative and Comparative Biology Conference, Jan. 3-7, 2015, West Palm Springs, FL.

Shahbazi, M., P. Jimenez, and **LL Carruth**. 2012. The effects of corticosterone treatment on song complexity and HVC size in the male zebra finch. Society for Integrative and Comparative Biology Conference, Jan. 3-7, 2012, Charleston, SC.

Frantz, KJ, SL Britner, JL Pecore, BA Williams, EA Weaver, II, R Poh, P Gagne, MK Demitrikopoulos, LL Carruth, CT Goode, and RL DeHaan. 2012. Collaborative research for undergraduates in neuroscience: A case student comprised of qualitative exploration of scientific research self-efficacy. Poster 26.10. Society for Neuroscience, 2012, New Orleans, LA. 2012 *Abstract Viewer and Itinerary Planner*.

Goode, CT, SL Britner, LL Carruth, P Gagne, MK Demitrikopoulos, BA Williams, JL Pecore, EA Weaver, II, R Poh, RL DeHaan, and Frantz, KJ. 2012. Collaborative research for undergraduates in neuroscience: Quantitative assessment of scientific research self-efficacy and related constructs. . Poster 26.11. Society for Neuroscience, 2012, New Orleans, LA. 2012 *Abstract Viewer and Itinerary Planner*.

Frantz, KJ, LL Carruth, MK Demitrikopoulos, JL Pecores, CT Goode, SL Britner, BA Williams, KL Falkenberg, EL Weaver, II, T Oliver, R Poh, PE Gagne, and RL DeHaan. 2011. Use of the experience sampling method (ESM) to assess summer research experiences by undergraduate students. Poster 24.06. Society for Neuroscience, 2012, Washington, DC. 2012 *Abstract Viewer and Itinerary Planner*.

Shahbazi, M. and **LL Carruth**. 2010. The role of glucocorticoid receptors and stress on the developmental of the avian song system. Society for Integrative and Comparative Biology Conference, Jan. 3-7, 2010, Seattle, WA

Shahbazi, M and LL Carruth. 2010. The effects of chronic corticosterone treatment on song nuclei size and song production in the male zebra finch. Poster 88.11. Society for Neuroscience, 2010, San Diego, CA. 2010 *Abstract Viewer and Itinerary Planner*.

Pecore, JL, MK Demetrikopoulos, **LL Carruth**, RL Dehaan, SL Britner, KL Falkenberg, PE Gagne, BA Williams, TR Oliver, CT Goode, R Poe, E Weaver, and KJ Frantz. 2010 Varied summer research experiences for undergraduate students evaluated with a mixed-methods (quantitative and qualitative) approach. Poster 26.11. Society for Neuroscience, 2010, San Diego, CA. 2010 *Abstract Viewer and Itinerary Planner*.

Pecore, JL and **LL Carruth**. 2009. Supporting science reform efforts through professional development. Poster presented at the Association for Science Teacher Education Annual Conference, January 8-10, 2009. Hartford, CT.

Duncan, KA, C Dams, P Jimenez, and **LL Carruth**. 2009. Knock-down of selective estrogen receptor coactivator RPL7 protein expression alters neuron number and volume in zebra finch song

- nuclei. Poster 666.8. Society for Neuroscience, 2009, Chicago, IL. *2009 Abstract Viewer and Itinerary Planner*.
- Duncan, KA, CJ Saldanha, and **LL Carruth**. 2009. Sex differences and localization of steroid receptor coactivator 1 (SRC-1) in the adult zebra finch brain. Poster 666.7. Society for Neuroscience, 2009, Chicago, IL. *2009 Abstract Viewer and Itinerary Planner*.
- Shahbazi, M and **LL Carruth**. 2009. The role of glucocorticoid receptors and stress on the development of the avian song system. Poster 786.20. Society for Neuroscience, 2009, Chicago, IL. *2009 Abstract Viewer and Itinerary Planner*.
- Pecore, JL, **LL Carruth**, C Hill, MK Demetrikopoulos, A Zaredetto-Smith, and KJ Frantz. 2009. Methods to maximize student engagement in informal science education. Poster 20.6. Society for Neuroscience, 2009, Chicago, IL. *2009 Abstract Viewer and Itinerary Planner*.
- Duncan, KA and **LL Carruth**. 2008. Antisense oligonucleotides to the estrogen receptor coactivator ribosomal protein L7 (RPL7) alter neuronal death in zebra finch primary neuronal cultures. Poster presented at the International Symposium on Avian Endocrinology, July 2008, Leuven, Belgium.
- Carruth, LL** and KA Duncan. 2008. Sexually dimorphic production of neurosteroids in the developing zebra finch brain. Poster 474.7. Society for Neuroscience, 2008, Washington, D.C. *2008 Abstract Viewer and Itinerary Planner*.
- Duncan, KA, AN Clancy and **LL Carruth**. 2008. Hormonal regulation of estrogen receptor coactivators in adult male zebra finch brain. Poster 474.8. Society for Neuroscience, Washington D.C., *2008 Abstract Viewer and Itinerary Planner*.
- Pecore, JL and **LL Carruth**. 2007. Why Animals Do What They Do at the Zoo: An in-service teacher workshop for improving neuroscience education and encouraging innovative teaching Southeastern Association for Science Teacher Education (SASTE) Annual Meeting, poster presentation, Oct. 26-27, Valdosta, GA.
- Carruth, LL** and KJ Frantz. 2007. Toward Integration: Dual-role bench and education scientists. Poster 28.11. Society for Neuroscience, 2007, San Diego CA. *2007 Abstract Viewer and Itinerary Planner*.
- Duncan, KA, Dams, C and **LL Carruth**. 2007. Localization of L7/SPA, an estrogen receptor-alpha coactivator, across zebra finch song nuclei development. Poster 294.12. Society for Neuroscience, 2007, San Diego CA. *2007 Abstract Viewer and Itinerary Planner*.
- Duncan, KA, Dams, C and **LL Carruth**. 2007. Localization of estrogen receptor-alpha and sex steroid coactivator L7/SPA in zebra finch song nuclei. Society for Behavioral Neuroendocrinology meeting, Pacific Grove, CA, 2007.
- Duncan, K.A., R.A. Herman and **LL Carruth**. 2006. Sex differences in sex steroid coactivator, L7/SPA, in zebra finch song control nuclei. Poster 152.22. Society for Neuroscience, 2006, Atlanta, GA. *2006 Abstract Viewer and Itinerary Planner*.
- Carruth, LL** and C. Okeke. 2006. Sex differences in p68, an estrogen receptor-alpha co-activator, in the zebra finch brain. Poster 152.13, Society for Neuroscience, 2006, Atlanta, GA. *2006 Abstract Viewer and Itinerary Planner*.

- Carruth, LL**, KJ Frantz, J Pecore, S Murphy, D Parlier, and MK Demetrikopoulos. 2006. Brain Camp for Kids: Using neuroscience as a theme for summer camp enrichment. Poster 23.10, Society for Neuroscience, 2006, Atlanta, GA. *2006 Abstract Viewer and Itinerary Planner*.
- Frantz, KJ, **LL Carruth**, and RL DeHaan. 2006. Best Practices in Science Education: a conference on active teaching and learning. Poster 24.13, Society for Neuroscience, 2006, Atlanta, GA. *2006 Abstract Viewer and Itinerary Planner*.
- Carruth, LL**, M McCandless, and B Hopps. 2005. Brainy Behavior: Middle and High School Lesson Plans Developed from an “Animal Behavior and the Brain” Teacher Professional Development Workshop. Poster 19.12, Society for Neuroscience, 2005, Washington D.C. *2005 Abstract Viewer and Itinerary Planner*.
- Frantz, KJ, **LL Carruth**, NR Hanna, and RL DeHaan. 2005. A Study in Neuroscience Education: Comparing Two Routes to Research for Novice Undergraduates. Poster 22.5, Society for Neuroscience, 2005, Washington D.C. *2005 Abstract Viewer and Itinerary Planner*.
- Paisley, JC, Huddleston, GG, Denman, HN, **Carruth, LL**, Grober, MS, Petrulis, A and Clancy AN. 2005. Inhibition of estrogen receptor synthesis in the medial preoptic area, but not the medial amygdala, reduces male rat mating behavior. Presented at the Annual Meeting of the Society for Behavioral Neuroendocrinology, University of Texas at Austin, June 21-24, 2005.
- Paisley, JC, GG Huddleston, **LL Carruth**, A Petrulis and AN Clancy. 2004. Infusion of Antisense Oligodeoxynucleotides Complementary to Estrogen Receptor mRNA into the Medial Preoptic Area, but not the Medial Amygdala, decreases Male Rat Mating Behavior. Poster 423.18, Society for Neuroscience, 2004, San Diego, CA. *2004 Abstract Viewer and Itinerary Planner*.
- Frantz, KJ, JC Redmond, JD Rose, MK Demetrikopoulos, LG Morris, D Gray, A Zardetto-Smith, and **LL Carruth**. 2004. Undergraduate Activities in K-12 Neuroscience Education. Poster 27.5, Society for Neuroscience, 2004, San Diego, CA. *2004 Abstract Viewer and Itinerary Planner*.
- Redmond, JC, **LL Carruth**, MK Demetrikopoulos, LG Morris, J Pecore, D Parlier, and KJ Frantz. 2004. Teaching about Gender Differences in Memory and Performance. Poster 28.1, Society for Neuroscience, 2004, San Diego, CA. *2004 Abstract Viewer and Itinerary Planner*.
- Carruth, LL**, HK Caldwell, D Parlier, K Zuehlke, and B Sanford. 2004. A Teacher Workshop in Behavioral Neuroscience: Animal Behavior and the Brain. Poster 27.4, Society for Neuroscience, 2004, San Diego, CA. *2004 Abstract Viewer and Itinerary Planner*.
- Zardetto-Smith AM, R Schneider, JD Rose, JC Redmond, K Mu, KJ Frantz, MK Demetrikopoulos, and **LL Carruth**. 2004. Brains Rule! Neuroscience Expositions: A Model for Improving the Ability of Neuroscience Professionals to Communicate Neuroscience. Poster 26.10, Society for Neuroscience, 2004, San Diego, CA. *2004 Abstract Viewer and Itinerary Planner*.
- Zola, S, MK Demetrikopoulos, KJ Frantz, JC Redmond, LG Morris, **LL Carruth**, EH Chudler, and WE Cameron. 2004. Society for Neuroscience Presence at Science Teacher Meetings. Poster 27.10, Society for Neuroscience, 2004, San Diego, CA. *2004 Abstract Viewer and Itinerary Planner*.
- Carruth, LL**, JD Rose, HK Caldwell, KJ Frantz, K Boyle, AE Duckett, LG Morris, and MK Demetrikopoulos. 2003. Developing Community Partnerships for Sustained Neuroscience K-12 and Public Educational Programs. Poster 27.7, Society for Neuroscience, 2003, New Orleans, LA.



- Redmond, JC and **LL Carruth**. 2003. Exploring the evolution of human uniqueness in the brain. Poster 27.13, Society for Neuroscience, 2003, New Orleans, LA.
- Carruth, LL** and AP Arnold. 2003. Sex differences in the songbird brain: using molecular tools to investigate brain sexual differentiation in a comparative model. *Society for Integrative and Comparative Biology*. S1.2, pg. 132-133.
- Carruth, LL**, I Reisert, and AP Arnold. 2002. Direct effect of sex chromosome genes on sexual differentiation of the mouse brain *in vitro*. Poster 33.14, Society For Neuroscience, 2002, Orlando, FL.
- Carruth, LL**, RE Jones, and DO Norris. 2001. Stress and Pacific Salmon: a new look at the role of cortisol in olfaction and home-stream migration. *American Zoologist*. S9.12, pg. 135.
- Carruth, LL**, B Ramachandran, P McClive, A Sinclair, and AP Arnold. 2001. Sexual differentiation in the hatchling zebra finch brain: differences in gene expression. The Second Annual Conference on Sex and Gene Expression (SAGE), Winston-Salem, NC.
- Carruth, LL**, EJ Griswold, and AP Arnold. 2001 Sex differences in ribosomal protein L7 expression in the hatchling and adult zebra finch brain. Poster 141.5, Society For Neuroscience, 2001, San Diego, CA.
- Carruth, LL**, B Ramachandran, P McClive, A Sinclair, and AP Arnold. 2000. Sex differences in gene expression in the hatchling zebra finch brain. Poster 224.25, Society For Neuroscience, 2000, New Orleans, LA.
- Maldonado, TA, **L Carruth**, RE Jones, and DO Norris. 2000. Glucocorticoid receptors and  $\beta$ -amyloid are correlated with neurodegeneration in the kokanee salmon brain. Poster 859.6, Society For Neuroscience, 2000, New Orleans, LA.
- Carruth, LL**, RE Jones, and DO Norris. 1998. Exogenous cortisol influences glucocorticoid receptor (GR)-immunoreactivity in the sexually immature kokanee salmon (*Oncorhynchus nerka kennerlyi*) brain. *American Zoologist*. 38(5): 77A. (Published)
- Carruth, L**, RE Jones, and DO Norris. 1998. Exogenous Cortisol Influences Glucocorticoid Receptor-Immunoreactive Neurons: Changes in Cell Number and Translocation in the Sexually Immature Kokanee Salmon Brain. Poster 543.13, Society For Neuroscience, Los Angeles, CA.
- Carruth, LL**, RE Jones, and DO Norris. 1996. Glucocorticoid receptor immunoreactivity in the brains of spawning and sexually immature kokanee salmon (*Oncorhynchus nerka kennerlyi*). *American Zoologist*. 36(5): 99A. (Published)
- Ruth, T, **L Carruth**, R Jones, D Norris, and R Does. 1997. Corticotrope function in Spawning Kokanee Salmon. Poster at the Thirteenth International Congress of Comparative Endocrinology, Yokahama, Japan. (Published)

#### **Grants and Awards:**

- “Effects of an evidence-based parenting program on steroid hormone biomarkers among parents at risk for perpetration of child abuse and neglect” Laura Carruth and Shannon Self-Brown (co-PIs), Research Initiation Grant, GSU, (\$24,716), Awarded July 1, 2014.
- “Early developmental stress and the avian brain”, PI, Brains & Behavior Program grant, Georgia

State University (\$24,214.65) July 2012.

*"A song so sweet: The hormonal modulation of vocal communication"*, Co-PI, Brains & Behavior Program grant, Georgia State University (\$28,913.21) July 2011.

*"Collaborative Research for Novice Undergraduates"* Co-PI, RO1 from National Institute of General Medical Sciences, 9/1/08-8/31/13 (\$1,174,615.00).

Georgia State University Outstanding Junior Faculty Award Spring 2008.

*"Coactivators and the Development of Avian Song Control Nuclei"* National Science Foundation three year award, 9/1/07-8/31/10, (\$298,079).

2007 Neuroscientist-Teacher Partner Award from the Society for Neuroscience's Public Education and Communication Committee, received with teacher partner Sally Murphy (Riverwood High School, Fulton County, GA).

*"The Role of Genetic Sex and Prolactin in Organizing Sleep Responses to Stress"*, Co- PI, Center for Behavioral Neuroscience (CBN) Venture Grant (\$29,900) awarded June 2007.

Award: Made a *National Academies Education Fellow in the Life Sciences* by the National Academies of Science, Feb. 2006

*"Enhancing Undergraduate Education"* Biotechnology Scholars Program Co-PI, HHMI (\$1.5 million), Awarded July 2006.

*"Brain Camp for Kids: Neuroscience in Action!"* PI, Center for Behavioral Neuroscience (CBN) Venture Grant (\$4,300) awarded June 2005.

*"Why They Do What They Do at the Zoo: Animal Behavior and the Brain"*, For all Georgia K-12 teachers, PI, Georgia Board of Regents Improving Teacher Quality Grant" (\$19,154) awarded May 2005.

*"Dominance status, stress, and the regulation of reproductive function"*, Co-PI, Brains & Behavior Program grant, Georgia State University (\$3500) Jan-July 2005.

*"The Role for p68, a Sex Steroid Cofactor, in Brain Sexual Differentiation"*, PI, Research Initiation Grant from Georgia State University (\$8,500) awarded June 2004.

*"Why They Do What They Do at the Zoo: Animal Behavior and the Brain"*, PI, Georgia Board of Regents Improving Teacher Quality Grant" (\$31,358) awarded May 2004.

*"Taking the Genomic Revolution into the High School Classroom"*, PI, Center for Behavioral Neuroscience (CBN) Venture Grant (\$19,000) awarded Dec. 2003.

*"The Function of c-fos in Sexual Behavior"*, Co-PI, Center for Behavioral Neuroscience (CBN) Venture Grant; Reproduction Collaboratory (\$30,000) awarded July 2002.

*"Instrumentation for the Molecular Analysis of Sex Differences in Psychomotor Stimulant Effects in Adult Rats."* Co-PI. Georgia State Research Equipment Award. May 2003. \$26,218.

*"Estrogen and Male Mating"* Co-PI, Center for Behavioral Neuroscience (CBN) Venture Grant; Reproduction Collaboratory (\$30,000) awarded Dec. 2002.

DAAD (Deutscher Akademischer Austausch Dienst) short term research grant. For travel to Universitaet of Ulm, January 2000-March 2000 (5000 DEM).

Nomination by Department of Environmental, Population and Organismic Biology for the University of Colorado Graduate School, Excellence and Creative Research Award, May 1998.

Nomination by Department of Environmental, Population and Organismic Biology for the University of Colorado, Boulder Graduate Teaching Excellence Award, Spring 1998.

Nomination by Department of Environmental, Population and Organismic Biology for the University of Colorado, Boulder Graduate Teaching Excellence Award, Spring 1997.

NSF Doctoral Dissertation Improvement Grant, "The Effects of Cortisol on Imprinting and Home-stream Water Recall" IBN 153-5739, May. 1997.

Environmental, Population and Organismic Biology Graduate Student TA award for excellence in teaching, University of Colorado, 1996.

Environmental, Population and Organismic Biology Fellowship, University of Colorado. 1996.

Dean's Small Grant, University of Colorado, 1996.

Maud O'Dell Summer Fellowship, Environmental, Population and Organismic Biology, University of Colorado. 1995.

Tuition Fellowship, The Grass Foundation. 1995. Molecular Neurobiology Course.  
Friday Harbor Laboratories. University of Washington.

Grant-in-Aid of Student Research, Sigma Xi. 1994.

Raney Award, American Society of Ichthyologists and Herpetologists, 1994.

Environmental, Population and Organismic Biology Fellowship Grant, University of Colorado. 1994.

Patricia Roberts Harris Three-Year Fellowship, 1993. University of Colorado and the U.S. Department of Education. tuition, stipend and research award.

Environmental, Population and Organismic Biology Fellowship Grant, University of Colorado. 1993.

Grant-in-Aid of Student Research, Sigma Xi. 1993.

Graduate/Undergraduate Research Apprenticeship Project, University of Colorado. 1993.

Dean's Small Grant, University of Colorado, 1992.

### **Institute or Workshop Participation:**

Faculty Workshop on Sustainability, Georgia State University, Jan. 9-10, 2014.

Invited member of the 2005 National Academies Summer Institute on Undergraduate Education in Biology, sponsored by the HHMI and National Academies of Science. July 31-Aug. 5, 2005, University of Wisconsin, Madison.

### **K-12 Teacher Professional Development Programs:**

Math and Science Partnership workshops with Fulton Co. schools, and the GSU college of Education, July 2011-2012.

“Build-A-Brain” invited workshop presenter for the winners of the 2007-2008 Presidential Awards in Mathematics and Science Teaching award, at the National Science Foundation, April 29, 2008, Arlington, VA. Participated with K. Frantz, GSU.

“Build-A-Brain” workshop presented at the National Association of Biology Teachers annual meeting Nov. 2007, Atlanta, GA

“Why They Do What They Do At The Zoo: Animal Behavior and the Brain. L. L. Carruth, at Zoo Atlanta, June 2003, July 2004, and June 2005-2011. Teachers received 4 professional learning units for participation.

“Why They Do What They Do At The Zoo: Animal Behavior and the Brain follow-up workshop. L. L. Carruth, at Zoo Atlanta, Nov. 2003-2007, Dec. 2008-2010. Teachers received 1 PLU for participation.

“His and Hers Brains: Gender Differences in Learning” Hands-on teacher workshop presented at the Georgia Independent School Association (GISA) meeting. L.L. Carruth, K. J. Frantz, J.C. Redmond, J. Pecore, and M.K. Demetrikopoulos, 1 Nov. 2004.

“The Genomic Revolution”. L.L. Carruth, at Fernbank Museum of Natural History in conjunction with the “Genomic Revolution” exhibit, June 21-25, 2004. Teachers received professional learning units for participation.

“Sex on Your Mind: Gender Differences in Learning” platform presentation, National Science Teachers Association (NSTA), L.L. Carruth, K. J. Frantz, J.C. Redmond, D. Parlier, J. Pecore, and M.K. Demetrikopoulos, 4 April 2004.

“His and Her Brain Turn-Ons” hands-on workshop, National Science Teachers Association (NSTA), K. J. Frantz, L.L. Carruth, J.C. Redmond, D. Parlier, J. Pecore, L. Morris, and M.K. Demetrikopoulos, 3 April 2004.

“His and Her Brains: Gender Differences in Problem-Solving Performance and Brain Activation”, L.L. Carruth, J.C. Redmond, and M.K. Demetrikopoulos. Society for Neuroscience Hands-On Neuroscience Workshops, 8 Nov. 2003.

Carruth, L.L. 1992. Sharks: Facts and Fantasies. Denver Museum of Natural History, Denver, Colorado. Four talks, one to over 300 Denver Public School Science Teachers, to accompany the national "Sharks: Facts and Fantasies" exhibit.

### **Teaching:**

Responsible Conduct in Research (Neur 8600), Fall 2014

Careers in Neuroscience (Neur 4960), Fall 2014

Topics in Neuroscience: Stress Across Life History (Neur 8790): GSU, Fall 2012

Hormones & Behavior (Biol 4241/6241, Neur 4420): GSU, Spring 2009-2014

Graduate Neuroendocrinology (Neur. Co-coordinator, GSU, Fall 2011

Graduate Research Seminar (Biol 8700): GSU, Fall 2007

Internships in Biology (Biol 4915/6915): GSU, Fall 2006, 2007 Spring 2007.

Careers in Biology Seminar (Biol 4960): GSU, Fall 2004, Spring 2005.

Neurobiology Laboratory (Biol 4180/6180): GSU, Spring 2003, 2004.

Foundations of Biology II (Biol 2108K): GSU, Fall 2003, 2005, and 2006.

Animal Biology (Biol 3840/7840): GSU, Fall 2002, 2008; Spring 2006, 2008, Fall 2009 and 2010.

Graduate Teaching Assistantships, University of Colorado, Boulder:

Comparative Vertebrate Anatomy, Spring 1997, Spring 1996,

Human Anatomy, Fall 1996, Fall 1995, Fall 1993, Spring 1992

General Biology Lab I, Summer 1996, Summer 1992, Fall 1991

### **K-12 Science Education:**

Neuroscience in Action! Middle School Week-long Brain Camps for Kids, Summer 2003-Summer 2009

K-12 classroom visits: Brain Awareness Month school visits, 2002-present.

Life Sciences for Native American high school students, Summer 1992, 1993, and 1994 for the American Indian Science and Engineering Society. This program consisted of lectures and laboratories emphasizing general biology as well as anatomy and physiology.

### **Guest Lectures:**

Georgia State University:

Careers in Psychology, Animal Behavior, Neurobiology II: Integrative (Biol 8020),

Neurobiology and Behavior,

Intro. to Graduate Studies, Principles of Biology II

University of Colorado at Boulder:

Comparative Vertebrate Anatomy, Human Anatomy,

### **Postdoctoral and Graduate Research Advising:**

Pedro Jimenez, PhD, postdoctoral fellow 2006-2008 (current position: Assistant Professor, Centro de Investigacion en Reproduccion Animal, Tlaxcala, Mexico)

Rebecca Herman, PhD, postdoctoral fellow 2005-2006

Kelli Adams Duncan, Neurobiology and Behavior doctoral student, 2005-Dec. 2008 (current position: Assistant Professor, Biology at Vassar College)

Mahin Shahbazi, Neuroscience doctoral student, 2006-2012 (current position: Lecturer at GSU)

Shauna Cheesman, Neuroscience doctoral student, 2010-current

Marjan Ghadrdran, Neuroscience doctoral student, 2014- current

Anne Kristel Bayani, Masters of Science, 2013- current

Christy Greene, Neuroscience doctoral student, 2011-2012

Chukwuemeka Okeke, Masters of Science, 2005- 2007

Heather Rysler, Masters of Science, 2003-2005

Rotation Students:

Joseph Terranova, Neuroscience doctoral student, Fall 2012

Mahin Shabazi, Neuroscience doctoral student, Fall 2005

Joseph Normandin, Neurobiology doctoral student, Fall 2004

Varenka Lorenzi, Neurobiology doctoral student, Fall 2003

Advisor for Non-thesis Biology Master's students

Vijay Ram 2006-2007, Sophia Banton 2006-2007, Porshee Black 2005-2006, Tia Robertson 2004-2005, Autum Key 2009-2011, Kristin Kelly Mayfield 2009-2011, Jalpa Patel, 2010-2011, Jocelyn Waldern, 2010-2011, Nadia Heidari, 2012, Josheph McNair, 2013

### **Undergraduate Research Advising:**

Georgia State University, 2002 to present

University Scholars, 3 students

Directed Readings (Biol 4999) 20 students

Introduction to Research (Biol 4910) 30 students

Honor's Program, 4 students

UCLA, 1998-2002

Center for Academic and Research Excellence (CARE) Program, summer 2000, 1 student

Undergraduate research assistant, 1998 school year, 1 student.

University of Colorado, Boulder, 1993-1998

Graduate/Undergraduate Research Apprenticeship Project

### **Departmental and University Service:**

College of A&S Graduate Program Council, August 2011-2014

College of A&S Faculty Awards Committee, 2010, 2011

College of A&S Laboratory Safety Committee, 2011-present

Faculty search committees, College of Education; Geosciences, College of A&S

Professional Education Faculty Diversity Committee, 2004-2011

Georgia State University Neuroscience Proposal writing committee Nov. 2007-Jan. 2008

Georgia State University Neuroscience Institute Executive Committee, 2009-present

GSU Aquarium Education Committee, 2003-2007

Ph.D. Committees, Department of Biology or Neuroscience PhD program

Elizabeth Jeffress, Varenka Larenzi, Claudia Leitner, Chen Li, Devaleena Pradhan, Edmund Rodgers, Karine Tonieri, Arianna Tamvacakis, Nicole Victoria, Kate McCann

Ph.D. Committee member outside GSU

Matthew Duckworth, University of Southern Mississippi, Dept. of Biology

Cary Leung, graduated in 2009, Dept. of Psychology, Emory University

Lisa Matragano, graduate in 2012, Neuroscience Program, Emory University

Ph.D. Qualifying Exam Committees, Dept. of Biology and Neuroscience Institute

2002-present, 23 students

Masters Thesis Committees

Carrie Paisley, Jeremiah Spence, Elizabeth Stokes, Anna S. Dunigan, Carmenada Canete

Reader for Masters of Science Theses

2002 – present, 31 students

### **Reviewed grants and manuscripts:**

NSF Modulation Panel member, March 23-25, 2009, 110 grants (primary for 7, secondary for 6)

Peer-reviewed submitted papers for the following journals (alphabetical order):

BMC Biology, BMC Neuroscience, Developmental Neurobiology, General and Comparative Endocrinology, Frontiers in Neuroendocrinology, Hormones and Behavior, Proceedings of the National Academy of Science  
Journal of Fish Biology, Journal of Neuroendocrinology, Neuroscience Letters

Ad hoc reviewer grants for the following granting agencies:

National Science Foundation

Oregon Sea Grant Proposal

National Environment Research Council (Great Britain)

**Peer-reviewed science education activities**

National Association of Health and Science Education Partnerships (NAHSEP) Learning Object Reviewer

August 2007, 2009, 2010

**Professional Societies and Positions Held:**

National Association of Biology Teachers

National Science Teachers Association

Atlanta Chapter of the Society for Neuroscience, Councilor (term 2008-2011)

Society for Neuroscience

Society for Behavioral Neuroendocrinology

Society of Integrative and Comparative Biology

**Community Service:**

Career Day Guest Speaker, Decatur High School, Feb. 25, 2014

Science Fair judge, various metro Atlanta schools, 2002-2013

Renfroe Middle School Life Science textbook selection committee, science representative, Fall 2010.

Winnona Park Elementary School "Animal Crackers" After School Program Accreditation Reviewer, 2002-2004.