

SHANNON FARRIS, Ph.D.

CONTACT INFORMATION:

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Research Triangle Park, NC 27709

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EDUCATION AND TRAINING:

- 2012– present **Postdoctoral Fellow**
National Institute of Environmental Health Sciences, NIH
Research Triangle Park, NC
Postdoctoral Advisor: Serena M. Dudek, Ph.D.
- 2012 **Ph.D. in Biomedical Sciences (Neuroscience)**
University of California Irvine
Irvine, CA
Dissertation Advisor: Oswald Steward, Ph.D.
- 2007 **B.S. in Biochemistry, conc. in Molecular Biology**
California Polytechnic State University San Luis Obispo
San Luis Obispo, CA

CURRENT FUNDING:

NIH Pathway to Independence Award K99/R00

2016–2018 K99 MH109626 (PI: Farris)

Cell-Type Specific Regulation of Dendritic mRNA in the Hippocampus

Goal: Identify whether different hippocampal subregions have distinct complements of dendritic RNA using RNA-Seq and assess the impact of local translation on (the lack of) plasticity in CA2.

NIEHS Division of Intramural Research Innovative Research Award

2017–2018 \$50,000 (PI: Farris)

Mechanisms Underlying Hippocampal CA2 Resistance to Injury

Goal: Identify the epitranscriptomic effects of injury on CA2 neurons using cell-type specific TU-tagging with m6A-Seq and assess targets for roles in conferring CA2 resistance to cell death.

AWARDS & HONORS:

- 2016 Best Poster Presentation Award, 14th annual NIEHS Science Day
2016 NIH Fellows Award for Research Excellence (FARE Award)
2015 NIH Fellows Award for Research Excellence (FARE Award)
2015 Poster Abstract Award, UT Austin Conference on Learning & Memory
2015 Travel Award, UT Austin Conference on Learning & Memory
2013 Best Poster Presentation Award, 11th annual NIEHS Science Day
2012 Best Poster Award, American Society for Biochemistry and Molecular Biology Meeting
2012 Travel Award, American Society for Biochemistry and Molecular Biology Meeting
2011 Travel Award, NIH Graduate Student Research Conference
2010 1st Place Graduate Presentation Award, 21st Graduate Women in Science Conference

PEER REVIEWED PUBLICATIONS:

1. Sarkar P, Dunn CJ, Bailey ER, **Farris S**, Zhao M, Dudek SM, Saha RN. (2017) Histone hypervariants H2A.Z.1 and H2A.Z.2 play independent and context-specific roles in neuronal activity-induced transcription of *Arc/Arg3.1* and other immediate early genes. *eNeuro*. 4(4). doi: 10.1523/ENEURO.0040-17.2017.
2. **Farris S**, Wang Y, Ward JM, Dudek SM. (2017) Optimized method for robust transcriptome profiling of minute tissues using laser capture microdissection and low-input RNA-Seq. *Frontiers Molecular Neuroscience*. 10:185. doi: 10.3389/fnmol.2017.00185.
3. Pirbhoy PS, **Farris S**, Steward O. (2017) Synaptically-driven phosphorylation of ribosomal protein S6 is differentially regulated at active synapses vs. dendrites and cell bodies by MAPK and PI3K/mTOR signaling pathways. *Learning and Memory*. 24(8):341-357. doi: 10.1101/lm.044974.117.
4. Fernandez de Velasco EM, Zhang L, Vo B, Tipps M, **Farris S**, Xia Z, Anderson A, Weaver CD, Dudek SM, Wickman K. (2017) GIRK2 splice variants and neuronal G protein-gated K⁺ channels: implications for channel function and behavior. *Scientific Reports*. 7(1):1639. doi: 10.1038/s41598-017-01820-2.
5. Alexander GM*, **Farris S***, Pirone JR, Zheng C, Colgin LL, Dudek SM. (2016) Social and novel contexts modify hippocampal CA2 representations of space. *Nature Communications*. 7:10300. doi: 10.1038/ncomms10300.
(*co-first authors) (Featured Image)
6. Dudek SM, Alexander GM, **Farris S**. (2016) Rediscovering area CA2: unique properties and functions. *Nature reviews. Neuroscience*. 17(2):89-102. doi:10.1038/nrn.2015.22.
(Cover Art)
7. Pirbhoy PS, **Farris S**, Steward O. (2016) Synaptic activation of ribosomal protein S6 phosphorylation occurs locally in activated dendritic domains. *Learning and Memory*. 23(6): 255-269. doi:10.1101/lm.041947.116.
8. Steward O, **Farris S**, Darnell J, Van Driesche SJ, Pirbhoy PS. (2015) Localization and local translation of *Arc/Arg3.1* mRNA at synapses: some observations and paradoxes. *Frontiers in Molecular Neuroscience*. 7:101. doi:10.3389/fnmol.2014.00101.
(Recommended in Faculty of 1000)
9. **Farris S**, Lewandowski G, Cox CD, Steward O. (2014) Selective localization of *Arc* mRNA in dendrites involves activity- and translation- dependent mRNA degradation. *Journal of Neuroscience*. 34(13): 4481-93. doi:10.1523/JNEUROSCI.4944-13.2014.
(Featured Article) (Recommended in Faculty of 1000)
10. Chotiner JK, Nielson J, **Farris S**, Lewandowski G, Huang F, Banos K, de Leon R, Steward O. (2010) Assessment of the role of MAP kinase in mediating activity-dependent transcriptional activation of the immediate early gene *Arc/Arg3.1* in the dentate gyrus in vivo. *Learning & Memory*. 17(2): 117-129. doi:10.1101/lm.1585910

PREPRINTS:

Alexander GM, Brown LY, **Farris S**, Lustberg D, Pantazis C, Gloss B, Plummer NW, Riddick NV, Moy SS, Jensen P, Dudek SM. CA2 Neuronal Activity Controls Hippocampal Oscillations and Social Behavior. bioRxiv 190504; doi: <https://doi.org/10.1101/190504>
(Submitted for second review).

MANUSCRIPTS IN PREPARATION:

Steward O, Matsudaira KM, **Farris S**, Pirbhoy PS, Worley P, Okamura K, Okuno H, Bito H. Delayed degradation and impaired dendritic delivery of intron-lacking EGFP-Arc/Arg3.1 mRNA in EGFP-Arc transgenic mice. (Submitted by invitation for Research Topic "Gene expression in Neurons: Seeing is Believing" with *Frontiers in Molecular Neuroscience*).

Farris S, Ward JM, Samadi M, Wang Y, Dudek SM. Hippocampal subregions express distinct dendritic transcriptomes that reveal a role for enhanced mitochondrial function in CA2. (In preparation).

Helton T, Zhao M, **Farris S**, Dudek SM. Heterogeneity of Hippocampal CA2 pyramidal cells: dendritic morphology, input response, and synaptic plasticity (In preparation).

BOOK CHAPTERS:

Farris S, Dynes, JL, Steward O. (2017) mRNA Trafficking to Synapses and Memory Formation. In: Sara, S.J. (ed.), *Mechanisms of Memory, Vol. 4 of Learning and Memory: A Comprehensive Reference, 2nd edition*, Byrne, J.H. (ed.). pp. 153–178. Oxford. Academic Press. <http://dx.doi.org/10.1016/B978-0-12-809324-5.21108-5>.

Farris S and Dudek SM. (2015) From Where? Synaptic Tagging Allows The Nucleus Not To Care. Sajikumar, S. (Ed.) *Synaptic Tagging and Capture: From Synapses to Behavior*. (pp. 143-153). New York. Springer. https://doi.org/10.1007/978-1-4939-1761-7_9.

Steward O, Dynes JL, **Farris S**. (2014) Local Protein Synthesis at Synapses. V. Pickel & M. Segal (Eds.) *The Synapse: Structure and Function*. (1st ed., pp. 173-191). Boston. Academic Press. <https://doi.org/10.1016/B978-0-12-418675-0.00006-7>.

Complete List of Published Work in NCBI My Bibliography:

<https://www.ncbi.nlm.nih.gov/sites/myncbi/1N31mtuPgukG/bibliography/40276623/public/?sort=date&direction=descending>

13 primary research articles, reviews, and book chapters (10 listed in PubMed). h-index: 5; i10-index: 5

TEACHING & MENTORSHIP:

NIEHS, NIH, Research Triangle Park, NC

2014–2017

Research Mentor for NIH Summer Internship Program in Biomedical Research

2016 NIEHS Office of Intramural Training & Education 4-week Mentor course
 2013–2015 Research Mentor for Duke Independent Study in Neuroscience Program
 2014 Scientists Teaching Science Pedagogy 12-week online course

UC Irvine, Irvine, CA

2011 Summer Research Mentor for High School student
 2011 Teaching Assistant, Neurobiology of Learning & Memory
 2008 Teaching Assistant, Undergraduate Biochemistry Laboratory
 2008 Teaching Assistant, AIDS Fundamentals

Students Mentored

Bejamin Slay, Dudek lab summer intern, Senior, UNC Wilmington, NC 2017
 Lauren Guojing Su, Dudek lab summer intern, Sophomore, Pomona College, CA 2016
 Jack Ruicong Zhong, Dudek lab summer intern, Junior, Columbia University, NY 2014
 Ritika Patil, Duke Independent Study student, Sophomore, Duke University, NC 2013-2015
 Grant Johnson, Steward lab summer intern, rising Freshman, CalPoly SLO, CA 2011

COMMUNITY ENGAGEMENT/PROFESSIONAL SERVICE:

NIEHS, NIH, Research Triangle Park, NC

2017– Ad Hoc reviewer for PLOS ONE
 2016– Ad Hoc reviewer for Scientific Reports, Nature Publishing Group
 2016– Society for Neuroscience Triangle Chapter Science Policy Committee
 2016–2017 Society for Neuroscience Triangle Chapter Sponsorship Committee
 2014–2016 Society for Neuroscience Triangle Chapter Representative
 2014–2015 Society for Neuroscience Early Career Policy Fellow
 2013–2014 NIEHS Annual Biomedical Career Symposium Committee

UC Irvine, Irvine, CA

2010–2012 Graduate Student Health Insurance Policy Committee
 2010–2012 Associated Graduate Student Social Committee
 2009–2010 Department of Anatomy & Neurobiology Journal Club Administrator

OTHER PROFESSIONAL EXPERIENCE:

2006–2007 Laboratory Assistant, Polyclonal Antibody Production Laboratory, Santa Cruz Biotechnology, Inc., Paso Robles, CA
 2006–2007 Undergraduate Research Assistant, Center for Coastal Marine Sciences, California Polytechnic State University San Luis Obispo, San Luis Obispo, CA

PROFESSIONAL MEMBERSHIPS & AFFILIATIONS:

2015– Duke Center for RNA Biology
 2012 American Society for Biochemistry and Molecular Biology
 2009– Society for Neuroscience

INVITED SPEAKER PRESENTATIONS:

Farris S, Ward JM, Samadi M, Wang Y, Dudek SM (2017). Transcriptome Profiling in Hippocampal Dendrites Reveals a Role for Mitochondria in CA2 Physiology and Function. *47th Society for Neuroscience*. Washington DC, USA. [Nanosymposium]

Farris S, Ward JM, Samadi M, Wang Y, Dudek SM (July, 2017). Transcriptome Profiling in Hippocampal Dendrites Reveals a Role for Mitochondria in CA2 Physiology and Function. *EMBO Meeting on RNA Localisation and Local Translation*. Barga, Italy. [Flash Talk]

Farris S, Wang Y, Ward JM, Dudek SM (2016). Transcriptome profiling in hippocampal CA2. *Winter Conference on Brain Research*. Breckenridge, CO. [Invited Talk]

Farris S, Alexander GM, Pirone JR, Dudek SM (2015). CA2 place cells link social and contextual information with representations of space. *UT Austin Conference on Learning & Memory*. Austin, TX. [Abstract Selected Talk]

Farris S, Wang Y, Ward JM, Dudek SM. (2015) Plasticity in Hippocampal Area CA2: Lost in Translation? *NIEHS Genomics Day*. Research Triangle Park, NC. [Invited Talk]

Farris S, Steward O (2012). Activity induces Arc mRNA degradation that is dependent upon translation and NMDA receptor activation. *Keystone Symposium: Synapses and Circuits*. Steamboat Springs, CO. [Abstract Selected Talk]

Farris S, Steward O (2010). Activity and translation-dependent mRNA degradation in neuronal dendrites. *40th Society for Neuroscience*. San Diego, CA. [Nanosymposium]

POSTER PRESENTATIONS:

Farris S, Ward JM, Samadi M, Wang Y, Dudek SM (2017). Transcriptome Profiling in Hippocampal Dendrites Reveals a Role for Mitochondria in CA2 Physiology and Function. *CSHL Wiring the Brain*. Cold Spring Harbor, NY.

Farris S, Ward JM, Samadi M, Wang Y, Dudek SM (2016). Transcriptome profiling in hippocampal dendrites. *46th Society for Neuroscience*. San Diego, CA.

Farris S, Wang Y, Ward J, Dudek SM (2015). Transcriptome profiling in hippocampal CA2. *45th Society for Neuroscience*. Chicago, IL.

Farris S, Wang Y, Ward J, Dudek SM (2015). Plasticity in hippocampal CA2: lost in translation? *EMBO Meeting on RNA Localisation and Local Translation*. Hersonissos, Greece.

Alexander GM, **Farris S**, Dudek SM (2014). Firing properties and immediate early gene mapping in hippocampal area CA2. *44th Society for Neuroscience*. Washington, DC.

Pantazis C, Zhao M, Alexander GA, **Farris S**, Dudek SM (2014). Role of IGF-1R in hippocampal CA2 plasticity and function. *13th Rett Syndrome Symposium*. Chantilly, VA.

Farris S, Alexander GM, Dudek SM (2013). Novel spatial exploration does induce immediate early gene expression in rat hippocampal area CA2. *43rd Society for Neuroscience*. San Diego, CA.

Farris S, Steward O (2012). Activity induces Arc mRNA degradation that is dependent upon translation. *42nd Society for Neuroscience*. New Orleans, LA.

Farris S, Salgado P, Steward O (2011). Site-specific phosphorylation of ribosomal protein S6 as an early marker for astrocyte activation in response to CNS injury. *41st Society for Neuroscience*. Washington, DC.

Farris S, Salgado P, Steward O (2011). Ribosomal protein S6 is phosphorylated at activated synapses *in vivo* in response to strong synaptic activity. *CSHL Conference on Synapses: From Molecules to Circuits & Behavior*. Cold Spring Harbor, NY.

Farris S, Lewandowski G, Steward O (2009). Activity-dependent mRNA degradation in neuronal dendrites. *49th American Society for Cell Biology*. San Diego, CA.

Farris S, Lewandowski G, Dynes JL, Steward O (2009) Sizing of Arc/Arg3.1 mRNA foci in dendritic lamina containing activated synapses using fluorescence in situ hybridization. *39th Society for Neuroscience*. Chicago, IL.