***Curriculum Vitae***

# Sara Nicole Burke, Ph.D.

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# Education

2009-2013 Postdoctoral Fellowship

Evelyn F. McKnight Brain Institute

Arizona Research Laboratories

Division of Neural Systems, Memory and Aging

Tucson, AZ

2002-2009 Ph.D. in Neuroscience, minor in Pharmacology

University of Arizona

Tucson, AZ

1999-2000 MS in Psychology

University of Oregon

Eugene, OR

# Professional Experience

July 2019-present Associate Professor

Oct 2013-2019 Assistant Professor

Department of Neuroscience

College of Medicine, University of Florida

Gainesville, FL

*Currently under review for tenure and promotion*

# Jan 2016-present Director of UF Summer Neuroscience Internship Program

# May 2017-2019 President Florida Consortium on the Neurobiology of Cognition

<http://fcneurocog.org/>

2000-2002 Research Associate

Oregon Health & Science University

Neurological Sciences Institute

Portland, OR

# Peer-Reviewed Publications *(in reverse chronological order)*

1. Hernandez AR, Truckenbrod LM, Federico QP, Campos KT, Moon BM, Ferekides N, D’Agostino D, **Burke SN** (2019). Additive benefits of time-restricted feeding plus a ketogenic diet on metabolic flexibility in advanced age. *In preparation*.
2. Colon-Perez LM, Turner SM, Lubke KN, Febo M\*, **Buke SN**\* (2019). Multi-scale imaging reveals aberrant connectome organization and elevated dorsal striatal *Arc* expression in advanced age. *Under revision eNeuro*, preprint available: <https://www.biorxiv.org/content/early/2018/10/03/434191>. \*Indicates shared corresponding author.
3. Hernandez AR, Hernandez CM, Truckenbrod LM, Campos KT, McQuail JA, Bizon JL and **Burke SN** (2019). Age and ketogenic diet have dissociable effects on synapse-related gene expression between hippocampal subregions. *Accepted, Frontiers in Aging Neuroscience*.
4. Zhou Y, Sheremet A, Qin Y, Kennedy J, DiCola N, **Burke SN**, and Maurer AP (2019). Methodological Considerations on the Use of Different Spectral Decomposition Algorithms to Study Hippocampal Rhythms. *eNeuro,* Aug 1;6(4)*.*
5. Gaynor LS, Curiel RE, Penate A, Rosselli M, **Burke SN**, Wicklund M, Loewenstein DA, Bauer RM (2019). Visual Object Discrimination Impairment as an early predictor of Mild Cognitive Impairment and Alzheimer’s disease. *In press, Journal of the International Neuropsychological Society.*
6. Kreher MA, Johnson SA, Mizell JM, Chetram DK, Guenther DT, Lovett SD, Setlow B, Bizon JL, **Burke SN**, Maurer AP (2019). The perirhinal cortex supports spatial intertemporal choice stability. *Neurobiology of Learning and Memory*, 162:36-46.
7. Chun E, Bumanglag AV, **Burke SN**, Sloviter RS (2019). Targeted hippocampal GABA neuron ablation by Stable Substance P-saporin causes hippocampal sclerosis and chronic epilepsy in rats. *Epilepsia*, 60(5): 52-57.
8. JohnsonSA, Turner SM, Lubke KN, CooperTL, Fertal KE, Bizon JL, Maurer AP, **Burke SN** (2019). Experience-dependent effects of muscimol-induced hippocampal excitation on mnemonic discrimination. *Frontiers in Systems Neuroscience,* 12:72.
9. Sheremet A, Kennedy JP, Qin Y, Zhou Y, Lovett SD, **Burke SN**, Maurer AP (2019). Theta-Gamma Cascades and Running Speed. *Journal of Neurophysiology, 121(2):444-458*.
10. **Burke SN**\*#, Turner SM#, Desrosiers CL, Johnson SA, Maurer AP\* (2018). Perforant path fiber loss results in mnemonic discrimination task deficits in young rats. *Frontiers in Systems Neuroscience,* 12:61*.* \*Indicates shared corresponding author, #These authors contributed equally.
11. Hernandez AR, Hernandez CM, Campos K, Truckenbrod L, Federico Q, Moon B, McQuail JA, Maurer AP, Bizon JL, **Burke SN** (2018). A ketogenic diet improves cognition and has biochemical effects in prefrontal cortex that are dissociable from hippocampus. *Frontiers in Aging Neuroscience,* 10:391.
12. Gray DT, Umapathy L, **Burke SN**, Trouard TP, Barnes CA (2018). Tract-specific white matter correlates of age-related reward devaluation deficits in macaque monkeys. *Journal of Neuroimaging in Psychiatry and Neurology*, 3(2):13-26.
13. Hernandez AR, Reasor JE, Truckenbrod LM, Campos KT, Federico QP, Fertal KE, Lubke KN, Johnson SA, Clark BJ, Maurer AP, **Burke SN** (2018). Dissociable effects of advanced age on prefrontal cortical and medial temporal lobe ensemble activity. *Neurobiology of Aging,* 70:217-232.
14. Hernandez CM, McQuail JA, Schwabe M, **Burke SN**, Setlow B, Bizon JL (2018). Age-related declines in prefrontal cortical expression of metabotropic glutamate receptors that support working memory. *eNeuro*, 5(3), eCollection 2018 May-Jun.
15. Malem-Shinitski N, Zhang Y, Gray DT, **Burke SN**, Smith AC, Barnes CA, Ba D (2018). A Separable Two-Dimensional Random Field Model of Binary Response Data from Multi-Day Behavioral Experiments. *Journal of Neuroscience Methods,* 307:175-187.
16. Gaynor LS, Mizell J, Johnson SA, Maurer AP, **Burke SN** (2018). Aging disproportionately affects dual-functions of the perirhinal cortex: discrimination versus association. *Behavioral Neuroscience,* 132(3):138-151*.*
17. **Burke SN**, Gaynor LS, Barnes CA, Bauer RM, Bizon JL, Roberson RD, Ryan L (2018). Shared Functions of Perirhinal and Parahippocampal Cortices: Implications for Cognitive Aging. *Trends in Neurosciences,* 41(6):349-359*.*
18. Hernandez AR, Hernandez CM, Campos KT, Truckenbrod LM, Sakarya Y, McQuail JA, Carter CS, Bizon JL, Maurer AP, **Burke SN** (2018). The Antiepileptic Ketogenic Diet Alters Hippocampal Transporter Levels and Reduces Adiposity in Aged Rats. *Journal of Gerontology, Series A Biological Sciences and Medical Sciences,* 73(4):450-458.
19. Hernandez CM, Vetere LM, Orsini CA, McQuail JA, Maurer AP, **Burke SN**, Setlow B, Bizon JL (2017). Decline of prefrontal cortical-mediated executive functions but attenuated delay discounting in aged Fischer 344 x Brown Norway hybrid rats. *Neurobiology of Aging*, 60:141-152*.*
20. Maurer AP\*, **Burke SN**\*, Diba K, Barnes CA (2017). Attenuated Activity across Multiple Cell Types and Reduced Monosynaptic Connectivity in the Aged Perirhinal Cortex. *Journal of Neuroscience,* 37(37):8965-8974*.* \*These authors contributed equally.
21. Maurer AP, Johnson SA, Hernandez AR, Reasor J, Cossio DM, Fertal KE, Mizell JM, Lubke KN, Clark BJ, **Burke SN** (2017). Age-related changes in lateral entorhinal and CA3 neuron allocation predict poor performance on object discrimination. *Frontiers in Systems Neuroscience*, 30;11:49.
22. Johnson SA, Turner SM, Santacroce LA, Bizon JL, Maurer AP, **Burke SN** (2017). Rodent age-related impairments in discriminating perceptually similar objects parallel those observed in humans. *Hippocampus,* 27(7):759-776.
23. Yoder WM, Lyman M, Muizza O, Ormerod BK, **Burke SN**, Setlow B, Smith DW, Bizon JL (2017). Interaction between age and perceptual similarity in olfactory discrimination learning in F344 rats: relationships with spatial learning. *Neurobiology of Aging,* 53:122-137.
24. Hernandez AR, Reasor JE, Truckenbrod LM, Lubke, K, Johnson SA, Bizon JL, Maurer AP, **Burke SN** (2017). Medial Prefrontal-Perirhinal Cortical Communication is Necessary for Flexible Response Selection. *Neurobiology of Learning and Memory,* 137:36-47*.*
25. Gray DT, Smith AC, **Burke SN**, Gazzaley A, Barnes CA (2017). Attentional updating and monitoring and affective shifting are impacted independently by aging in macaque monkeys. *Behavioural Brain Research,* 322(Pt B):329-338.
26. Johnson SA, Sacks PK, Turner SM, Gaynor LS, Ormerod BK, Maurer AP, Bizon, JL, **Burke SN** (2016). Discrimination performance in aging is vulnerable to interference and dissociable from spatial memory. *Learning & Memory,* 23(7):339-48*.*
27. Sheremet A, **Burke SN**, Maurer AP (2016) Movement Enhances the Nonlinearity of Hippocampal Theta. *The Journal of Neuroscience,* 36(15):4218-4230*.*
28. Hernandez AR\*, Maurer AP\*, Reasor JE, Turner SM, Barthle SE, Johnson SA, **Burke SN** (2015). Age-related Impairments in Object-Place Associations Signify a Decline in Systems-level Neural Communication. *Behavioral Neuroscience,* 129(5):599-610.
29. **Burke SN**, Barnes CA (2015). The Neural Representation of 3-Dimensional Objects in Rodent Memory Circuits. *Behavioural Brain Research,* 285: 60-6.
30. Topper NC, **Burke SN**, Maurer AP (2014). Multiple Frequency Audio Signal Communication as a Mechanism for Neurophysiology and Video Data Synchronization. *Journal of Neuroscience Methods,* 34(2):467-80.
31. Maurer AP, Lester AW, **Burke SN**, Ferng J, Barnes CA (2014). Back to the Future: Preserved hippocampal network activity during reverse ambulation**.** *Journal of Neuroscience,* 34(45):15022-31.
32. **Burke SN**, Thome A, Plange K, Engle JR, Trouard TP, Gothard KM, Barnes CA (2014). Orbitofrontal cortex and basolateral amygdala volume show a dissociable relationship with reward devaluation in young and aged monkeys. *Journal of Neuroscience*, 34(30): 9905-16.
33. **Burke SN**, Maurer AP, Nematollahi S, Uprety A, Wallace JL, Barnes CA (2014). Advanced age has dissociative effects on dual functions of the perirhinal cortex. *Journal of Neuroscience,* 34(2): 467-480.
34. Hartzell AL, **Burke SN**, HoangLT, Lister JP, Rodriguez CN, Barnes CA (2013). Transcription of the immediate-early gene *Arc* in CA1 of the hippocampus reveals activity differences along the proximodistal Axis that are attenuated by advanced age. *Journal of Neuroscience,* 33(8):3424-33.
35. Takehara-Nishiuchi K, Insel N, Hoang LT, Wagner Z, Olson K, Chawla MK, **Burke SN**, Barnes CA (2013). Activation patterns in superficial layers of neocortex change between experiences independent of behavior, environment, or the hippocampus. *Cerebral Cortex*, 23(9):2225-34.
36. Maurer AP, **Burke SN**, Lipa P, Skaggs WE, Barnes CA (2012). Greater running speeds result in altered hippocampal phase sequence dynamics. *Hippocampus*, 22(4):737-47.
37. **Burke SN**, Ryan L, Barnes CA (2012). Characterizing cognitive aging of recognition memory and related processes in animal models and in humans. *Frontiers in Aging Neuroscience*, 4(15).
38. **Burke SN**, Hartzell AL, Lister JP, Hoang LT, Barnes CA (2012). Layer V perirhinal cortical ensemble activity during object exploration: a comparison between young and aged rats. *Hippocampus,* 22(10):2080-93*.*
39. **Burke SN**, Maurer AP, Hartzell AL, Nematollahi S, Uprety A, Wallace JL and Barnes CA (2012). [Representation of three-dimensional objects by the rat perirhinal cortex](http://www.ncbi.nlm.nih.gov/pubmed/22987680). *Hippocampus*, 22(10):2032-44.
40. **Burke SN,** Wallace JL, Hartzell AL, Nematollahi, Plange K, Barnes CA (2011). Age-associated deficits in pattern separation functions of the perirhinal cortex: a cross-species consensus. *Behavioral Neuroscience*, 125(6): 836-47
41. **Burke SN**, Maurer AP, Nematollahi S, Uprety AR, Wallace JL and Barnes CA (2011). The influence of objects on place field expression and size in distal hippocampal CA1. *Hippocampus*, 21(7):783-801.
42. **Burke SN**, Barnes CA (2010). Senescent synapses and hippocampal circuit dynamics. *Trends in Neurosciences*, 33(3): 153-61.
43. **BurkeSN**, Wallace JL, Nematollahi S, Uprety AR and Barnes CA (2010). Pattern separation deficits may contribute to age-associated recognition deficits. *Behavioral Neuroscience*, 24(5): 559-573.
44. Gerrard JL, **Burke SN**, McNaughton BL, Barnes CA. (2008). Sequence reactivation in the hippocampus is impaired in aged rats. *Journal of Neuroscience*, 28(31):7883-90.
45. **Burke SN**, Maurer AP, Zhiyoung Y, Navratilova Z, Barnes CA (2008). Glutamate receptor-mediated restoration of experience-dependent place field expansion plasticity in aged rats. *Behavioral Neuroscience*, 122(3), 535-548.
46. Maurer AP, Cowen SL, **Burke SN**, Barnes CA, McNaughton BL (2006). Organization of hippocampal cell assemblies based on theta phase precession. *Hippocampus*, 16, 785-794.
47. Maurer AP, Cowen SL, **Burke SN**, Barnes CA, McNaughton BL (2006). Phase precession in hippocampal interneurons showing strong functional coupling to individual pyramidal cells. *Journal of Neuroscience*, 26, 13485-13492.
48. **Burke SN**, Barnes CA (2006). Neural plasticity in the ageing brain. *Nature Reviews Neuroscience*, 7, 30-40.
49. **Burke SN**, Chawla MK, Penner MR, Crowell BE, Worley PF, Barnes CA, McNaughton BL (2005). Differential encoding of behavior and spatial context in deep and superficial layers of the neocortex. *Neuron* 45, 667-674.
50. Eisner A, **Burke SN**, Toomey MD (2004) Visual sensitivity across the menstrual cycle. *Visual Neuroscience*, 21, 513-531.
51. Chawla MK, Lin G, Olson K, Vazdarjanova A, **Burke SN**, McNaughton BL, Worley PF, Guzowski JF, Roysam B, Barnes CA (2004). 3D-catFISH: A system for automated quantitative three-dimensional compartmental analysis of temporal gene transcription activity imaged by fluorescence *in situ* hybridization. *Journal of Neuroscience Methods,* 139(1):13-24.
52. Stewart CE, **Burke S**, Marrocco RT. (2000). Cholinergic modulation of covert orienting in the rat. *Psychopharmacology*, 155, 210-218.

**Other Publications and Book Chapters**

1. Hernandez AR, Burke SN (2018). Age-related changes in 'hub' neurons. *Aging*, 10(10): 2551-2552.
2. **Burke SN**, Barnes CA (2018). The Contribution of Recollection, Familiarity and Discrimination to Object Recognition Deficits in Advanced Age. In Handbook of Object Novelty Recognition, ed Abdel Ennaceur.
3. **Burke SN** (*2018*). Award for Distinguished Scientific Early Career Contributions to Psychology: Sara N. Burke. *American Psychologist.*
4. McQuail JA, Johnsn SA, **Burke SN**, Bizon JL (*in press*). Rat Models of Cognitive Aging. In Conn's Handbook of Models for Human Aging, CH 17, ed Jeffrey Ram
5. Foster TC, **Burke SN** (*in press*). Animal Models of Cognitive Aging and Circuit-Specific Vulnerability. In Geriatric Neurology, eds DeKosky and Asthana.
6. **Burke SN** (2009). A Perceptual-mnemonic role for the perirhinal cortex is age-associated cognitive decline. Ph.D. dissertation, University of Arizona.
7. **Burke SN** and Barnes CA (2008). Aging ensembles: circuit contributions to memory deficits. In *Hippocampal Place Cells Relevance to Learning and Memory*, pages 364-384. Edited by Mizumori S.
8. **Burke SN** (2000). Endogenous visuospatial orienting in the rat: Parametric manipulations of the detection of centrally cued targets. Master’s Thesis, University of Oregon.
9. **Burke SN** (1999). Dopaminergic modulation of covert visuospatial orienting in the rat. Honor’s Thesis, University of Oregon.

# First Author and Other Selected Abstracts

1. Hernandez AR, Hernandez CM, Campos K, Truckenbrod LM, Federico QP, Moon BM, McQuail, JA, Maurer AP, Bizon JL, **Burke SN** (2018). Nutritional ketosis enhances cognitive resilience in young and aged rats. *Society for Neuroscience 48: San Diego, CA.*
2. **Burke SN**, Crider A, Olczak KP, Dirr EW, Lubke KN, Nick J, McLaurin B, Atkinson E, Otto KJ, Maurer AP, Lamb DG, Setlow B, Bizon JL (2018). Acute vagus nerve stimulation attenuates novelty-induced arc transcription in dorsal CA1. *Society for Neuroscience 48: San Diego, CA.*
3. Johnson SA, Turner SM, Lubke KN, Fertal KE, Maurer AP, Bizon JL, **Burke SN** (2018). Hippocampal, perirhinal, and lateral entorhinal contributions to mnemonic discrimination in young and aged rats. *Society for Neuroscience 48: San Diego, CA.*
4. McQuail JA, Johnson SA, Litenski MN, Ghay S, Rossi SL, Chakrabarty P, Giasson BI, **Burke SN**, Bizon KL (2018). Normal aging increases susceptibility to human wild type tau in transentorhinal cortex. *Society for Neuroscience 48: San Diego, CA.*
5. Colon-Perez LM, Turner SM, **Burke SN**, Febo M (2017). Connectivity changes after cognitive training in young and aged rats. *Society for Neuroscience*, 47: Washington D.C.
6. Gray DT, Smith AC, **Burke SN**, Barnes CA (2017). The alpha-2 noradrenergic receptor agonist guanfacine impairs flexible attention in young and aged macaques. *Society for Neuroscience*, 47: Washington D.C.
7. Hernandez AR, Truckenbrod LM, Reasor JE, Fertal KE, Johnson SA, Clark BJ, Maurer AP, **Burke SN** (2017). Age-related changes in the perirhinal-hippocampal-prefrontal cortical circuit: evidence for neural compensation in aged rats. *Society for Neuroscience*, 47: Washington D.C.
8. Hernandez CM, Orsini CA, Labiste C, DInghal SM, **Burke SN**, Frazier CJ, Setlow B, Bizon JL (2017). Optogenetic inactivation of basolateral amygdala in young rats recapitulates aged rats’ ability to delay gratification in an intertemporal choice task. *Society for Neuroscience*, 47: Washington D.C.
9. Johnson SA, Turner SM, Fertal KE, Santacroce LA, Bizon JL, Maurer AP, **Burke SN** (2017). Role of CA3 and dentate gyrus in the discrimination of perceptually similar objects depends on novelty of stimuli. *Society for Neuroscience*, 47: Washington D.C.
10. Kennedy J, Qin Y, Mizell JM, Elvira Martin C, Guenther DT, Herdegen C, **Burke SN**, Sheremet A, Maurer AP (2017). Spectral evolution of the medial entorhinal local-field potential across behavior. *Society for Neuroscience*, 47: Washington D.C.
11. Kyle C, Smith AC, Gray DT, **Burke SN**, Barnes CA (2017). Temporal contiguity predicts reward association learning in bonnet macaques. *Society for Neuroscience*, 47: Washington D.C.
12. Malem-Shinitski N, Zhang Y, Gray DT, **Burke SN**, Smith A, Barnes CA (2017). A separable state-space model of learning across trials and days in an aging study in macaque monkeys. *Society for Neuroscience*, 47: Washington D.C.
13. Mizell JM, Chetram DK, Kreher MA, Wasanwala H, Garcia-Sosa S, Johnson SA, Setlow B, Bizon JL, **Burke SN**, Maurer AP (2017). Untangling the cortical-hippocampal circuitry of spatial delay discounting. *Society for Neuroscience*, 47: Washington D.C.
14. Vetere L, Orsini C, McQuail J, **Burke SN**, Setlow B, Bizon JL (2016). Age-related alterations in working memory and intertemporal choice in Fischer X Brown Norway 344 hybrid rats. *Society for Neuroscience*. 46: San Diego.
15. Umapathy L, Gray DT, **Burke SN**, Trouard TP, Barnes CA (2016). Uncinate fasciculus integrity assessed in young and aged bonnet macaques. *Society for Neuroscience.* 46: San Diego.
16. Turner SM, Santacroce LA, Johnson SA, **Burke SN**, Maurer AP (2016). A rodent model of medial temporal lobe-dependent discrimination deficits in the elderly. *Society for Neuroscience*. 46: San Diego.
17. Maurer AP, Elvira-Martin CH, **Burke SN**, Sheremet A (2016). Velocity modulated hippocampal local-field potential across hippocampal lamina. *Society for Neuroscience.* 46: San Diego.
18. Johnson, Yoder W, Lubke K, Lister J, Maurer A, Bizon JL, **Burke SN** (2016). Broad neuronal population coding in hippocampus relative to piriform cortex during difficult olfactory discriminations. *Society for Neuroscience.* 46: San Diego.
19. Hernandez, K Campos, L Truckenbrod, L Santacroce, C Hernandez, Y Sakarya, J McQuail, A Maurer, Bizon, JL, Carter, C, **Burke SN** (2016). The ketogenic diet as a therapeutic strategy for improving motor and cognitive functioning in a rodent model of senescence. *Society for Neuroscience.* 46: San Diego.
20. Gaynor LS, Mizell JM, Campos KT, Santacroce L. McEwen C, Chetram DK, Maurer AP, Bauer R, **Burke SN** (2016). Stimulus modality affects recognition behavior during spontaneous object recognition and crossmodal object recognition tasks. *Society for Neuroscience.* 46: San Diego.
21. Andersh KM, Gray DT, Smith AC, **Burke SN**, Gazzaley A, Barnes CA (2016). Age-related attentional control and set shifting impairments arise independently in macaque monkeys. *Society for Neuroscience.* 46:San Diego.
22. Topper N, Ndum R, Hernandez AR, Johnson SA, Reasor J, Mizell JM, Turner SM, Maurer AP, and **Burke SN** (2015). An open-source software suite for collecting and analyzing spontaneous object recognition data.  *Society for Neuroscience.*  45: Chicago.
23. Reasor JE, Hernandez AR, Turner SM, Bathle SE, Johnson SA, Maurer AP, and **Burke SN** (2015). Age-related impairments in object-place associations signify a decline in systems-level neural communication.  *Society for Neuroscience.*  45: Chicago.
24. Ndum R, Topper NC, Hernandez AR, **Burke SN**, and Maurer AP (2015). A low-cost, open-source gait tracker for rodents.  *Society for Neuroscience.*  45: Chicago.
25. Maurer AP, **Burke SN**, and Sheremet A (2015). Nonlinear oscillations of the hippocampus. *Society for Neuroscience.*  45: Chicago.
26. Johnson SA, Gaynor LS, Sacks PK, Turner SM, Yoder WM, Ormerod BK, Maurer AP, Bizon JL, and **Burke SN** (2015). Age-related decline of spatial discrimination performance based on difficulty may reflect pattern separation deficits.  *Society for Neuroscience.*  45: Chicago.
27. Hernandez AR, Reasor JE, Turner SM, Barthle SE, Johnson SA, Bizon JL, Maurer AP, and **Burke SN** (2015). Object-place paired associations require interactions between prefrontal and perirhinal cortices.  *Society for Neuroscience.*  45: Chicago.
28. Gray DT, Ashford SL, Pyon W, **Burke SN**, Smith AC, and Barnes CA (2015). Behavioral evidence for enhanced interference during working memory and associative learning tasks in aged macaques.  *Society for Neuroscience.*  45: Chicago.
29. Gaynor LS, Johnson SA, Sacks PK, Maurer AP, Bizon JL, and **Burke SN** (2015). Cholinergic modulation of spatial discrimination performance in young and aged rats.  *Society for Neuroscience.*  45: Chicago.
30. Comrie A, Gray DT, **Burke SN**, Smith AC, and Barnes CA (2015). Species- and age-related differences in learning and performance on working memory tasks in two species of macaque monkeys.  *Society for Neuroscience.*  45: Chicago.
31. Bharadwaj BK, **Burke SN**, Trouard TP, Chen K, Moeller JR, Barnes CA, and Alexander GE (2015). Age-associated regional network pattern of MRI gray matter in the bonnet macaque.  *Society for Neuroscience.*  45: Chicago.
32. **Burke SN**, Maurer AP, Cowen SL & Barnes CA (2013). [Perirhinal cortical interneurons exhibit reduced firing rates with advanced age](http://www.abstractsonline.com/Plan/ViewAbstract.aspx?sKey=a8281de2-a3de-4bee-9220-1459531d92bc&cKey=f6424106-1574-4419-8773-c4e580a60564&mKey=%7b8D2A5BEC-4825-4CD6-9439-B42BB151D1CF%7d). *Society for Neuroscience Abstracts, 43*.
33. **Burke SN**, Hartzell AL, Lister JP, Hoang LT & Barnes CA (2012). The effects of age and environmental change on *Arc* transcription in perirhinal cortical ensembles following object exploration. *Society for Neuroscience Abstracts, 42.*
34. **Burke SN**, Hartzell A, Hoang L, Wallace JL, Maurer AP, Chawla MK, Barnes CA (2010). Transcription of the immediate-early gene *Arc* in the perirhinal cortex does not show a response decrement following repeated exposures to novel objects. *Society for Neuroscience Abstracts, 40.*
35. **Burke SN**, Maurer AP, Nematolahi SN, Wallace JL, Uprety A, Barnes CA (2009). Age effects on neuronal activity in the perirhinal cortex. *Society for Neuroscience Abstract, 39.*
36. **Burke SN**, Maurer AP, Nematollahi SN, Uprety J, Wallace JL, Barnes CA (2008). The effect of aging and novelty on the single-unit activity of perirhinal cortical neurons. *Society for Neuroscience Abstract, 38.*
37. **Burke SN**, Maurer AP, Navratilova Z, McNaughton BL, Barnes CA (2007). Young and old rats show a full cycle of theta phase precession during the first pass through a place field in a familiar environment. *Society for Neuroscience Abstract*, 37.
38. **Burke SN**, Maurer AP, Navratilova Z, McNaughton BL, Barnes CA (2005). The Non-competitive NMDA Receptor Antagonist Memantine Reinstates Experience-Dependent Plasticity in Aged Rats. *Society for Neuroscience Abstract*, 35
39. **Burke SN**, Chawla MK, Penner MR, Worley PF, Barnes CA, McNaughton, BL (2004). Differential distribution of activity-induced *Arc* RNA in deep and superficial laminae of the posterior parietal cortex. *Society for Neuroscience Abstract*, 34.
40. **Burke SN**, Chawla MK, Penner MR, McNaughton BL, Barnes CA (2003). Distribution of activity-induced *arc* RNA confirms place and movement encoding distinction between hippocampus and posterior parietal cortex. *Society for Neuroscience Abstract*, 33.
41. **Burke SN**, Eisner A (2001). Visual function fluctuations during the menstrual cycle of young healthy women. *Association for Research in Vision and Ophthalmology Abstract*.

# Invited Talks

July 2, 2019 University of California, Irvine Integrative Health Institute Seminar, Irvine, CA. “An Integrative Approach to Understanding and Treating Cognitive Aging”

April 17, 2019 NIA Postdocs in Aging Seminar Series, “*Neural Network and Metabolic Mechanisms of Cognitive Aging.*”

March 3, 2019 Sia Brain Awareness Foundation Banquet Keynote Speaker, Lake Mary, FL. “5 Simple Rules for Eating to a Healthier Brain” *Invited Public Lecture*

Dec 11, 2018 Clinical Translation Aging Research Seminar, Gainesville, FL. “Neural Network and Metabolic Mechanisms of Cognitive Aging”

Dec 4, 2018 University of California, Irvine Center for Neurobiology of Learning and Memory Colloquium. “Neural Network and Metabolic Mechanisms of Cognitive Aging”

Sep 6, 2018 University of Florida, Department of Neuroscience Seminar, Gainesville, FL. “Linking Cognitive Aging to Cortical Connectivity: Why We Should Ask More of Our Rats”

Feb 19, 2018 University of Texas, Dallas Center for Vital Longevity, Dallas, TX. “A Systems-level Understanding of Cognitive Aging in Pre-clinical Models”

Nov 28, 2017 Kavli Institute for Systems Neuroscience Symposium, Trondheim, Norway. “Working Towards a Systems-level Understanding of Cognitive Aging” ***Invited - International***

Oct 20, 2017 Cade Museum Public Talk, Gainesville, FL. “Is there a blueprint for successful aging? Lessons from centenarians.”

Sept 1, 2017 Department of Psychological and Brain Sciences Colloquium, University of Iowa. “Working Towards a Systems-level Understanding of Cognitive Aging”

April 6, 2017 Cognitive Aging Summit, Washington DC. “An animal model of cognitive aging: Do compensatory neural processes confer resilience?”

March 9, 2017 Neuroscience Seminar, Brown University. “Working Towards a Systems-level Understanding of Cognitive Aging”

Feb 29, 2016 Behavioral Neuroscience Brown Bag Seminar Series, University of Delaware, Newark, DE. “Working Towards a Systems-level Understanding of Cognitive and Physical Senescence.”

Dec 10, 2015 *Keynote Speaker*, Conference on Aging and Dementia, University of Rzeszow, Rzeszow, Poland. “Cortical structure and function in aging and Alzheimer’s disease”

Oct 8, 2015 University of Florida, Department of Neuroscience Seminar, Gainesville, FL. “Working towards a systems-level understanding of cognitive aging”

Sept 30, 2015 Rehabilitation Science Seminar, Gainesville, FL. *“Understanding the Bi-directional relationship between physical and cognitive performance with aging”*

June 9, 2015 Spring Hippocampal research Conference, Toarmina, Italy. “*Age-related deficits in the acquisition of object-place associations: the role of perirhinal-hippocampal interactions”*

May 18, 2015 Institute on Aging Seminar, Gainesville, FL. “*Working towards a systems-level understanding of cognitive aging*”

April 27, 2015 Institute for Brain and Machine Cognition Symposium, Gainesville, FL. “*Age-related neural communication deficits*”

April 16, 2015 Oak Hammock Institute for Learning in Retirement Seminar, Gainesville, FL. “*The discovery of cells that constitute a positioning system in the brain*”

Nov 20, 2014 Howard Hughes Medical Institute, Science for Life Seminar. “*Behavioral Insights into the Neurobiology of Aging*”

Oct 9, 2014 Clinical and Translational Sciences Institute Student Seminar Speaker. “*Cognition and Memory Dysfunction in Animals*”

Oct13, 2014 Neurotechnology/Neuromodulation Dinner group speaker, Gainesville, FL. “*A novel tool for examining circuit integrity in aging and disease*”

April 25, 2014 McKnight Inter-Institutional Meeting, Rising Starts Symposium. “*Dissecting Cortical-Hippocampal Circuits across the Life Span*”

April 15, 2014 University of Florida Neuroscience Club. “The Neurobiology of Cognitive Aging”

Feb 11, 2014 Florida Atlantic University/Scripps/Max Planck Jupiter Campus Neuroscience Seminar. “Senescence and Perirhinal Cortical Function: A Multi-level Approach to Understanding Cognitive Function”

Jan 16, 2014 Florida BRAIN Initiative Symposium, Gainesville, FL. “*Deriving Meaning from the Neural Code: Big Data is Neurophysiology”*

Jan 6, 2014 Winter Conference on Learning and Memory, Park City, UT. “*Perirhinal Cortical Circuit Disruptions in a Rat Model of Normal Aging*”

Jan 5, 2014 Winter Conference on Learning and Memory, Park City, UT. “*False Recognition in Normal Aging*”

June 6, 2014 New York University Center for Neural Science Seminar. “Senescence and Perirhinal Cortical Function: A Multi-level Approach to Understanding Cognitive Aging”

Mar 9, 2013 Morehouse College of Medicine, Department of Neurobiology Seminar. “Behavioral Insights into the Neurobiology of Aging”

May 3, 2011 4th Annual McKnight Inter-institutional Meeting, Miami, FL. “*The Effects of Distraction and Interruption Forms of Interference on Recognition Memory*”

Mar 17, 2011 Spring Brain Conference, Tucson, AZ. “*Perirhinal Cortex-dependent Pattern Separation Deficits in Advanced Age: A Cross-species Consensus of Rats and Monkeys*”

Feb 2, 2011 Perirhinal Cortex Seminar, Tucson, AZ. “*Transcription of the Immediate-Early Gene Arc in the Perirhinal Cortex Does Not Show a Response Decrement Following Repeated Exposures to Novel Objects*”

Nov 14, 2010 Society for Neuroscience Press Conference, San Diego, CA. “*The Effects of Perceptual Difficulty and Age on Spontaneous Object Recognition*”

Oct 25, 2010 McKnight Brain Research Foundation Site Visit, Tucson, AZ. “*Cognitive Aging Beyond the Hippocampus: The Perirhinal Cortex and High Level Visual Perception”*

Sept 27, 2010 Cognitive Neural Systems Seminar, Tucson, AZ. “*A Perceptual-Mnemonic Role for the Perirhinal Cortex in Age-associated Cognitive Decline*”

# Conference Symposium Organized

# Feb 12, 2019 Winter Conference on Neural Plasticity. Rethinking the content-based parcellation of the medial temporal lobe. Speakers: Sara Burke (University of Florida), Inah Lee (Seoul National University), Rebecca Burwell (Brown University), Jim Knierim (Johns Hopkins University). Role: Organizer and chair

# April 22, 2018 International Conference on Learning and Memory (*International*). Rethinking content-based parcellation of the medial temporal lobe. Speakers: Lee Ryan (University of Arizona), Sara Burke (University of Florida, Cyriel Pennartz (University of Amsterdam), Kristen Scaplen Kerr (Brown University). Role: Organizer and co-chair

# June 16, 2017 Spring Hippocampal Research Conference (*International*). The hippocampus and prospective processing. Speakers: Alison Preston (University of Texas at Austin, USA), Andrew Maurer (University of Florida, Gainesville, USA). Benjamin Dunn (Kavli Center for Neuroscience, Norway), ​Amy Griffin (University of Delaware, USA). Role: Organizer and co-chair

# Jan 7, 2017 Park City Winter Conference on the Neurobiology of Learning and Memory (*International*). The Role of the Medial Temporal Lobe in Sensory Discrimination and the Relationship with Memory. Speakers: Jennifer Bizon (University of Florida), Andrew Maurer (University of Florida), Michael Yassa (UC Irvine), and Sarah Johnson (University of Florida). Role: Organizer and chair.

# Honors and Awards

1999 Phi Beta Kappa, inducted

Departmental honors in Psychology, University of Oregon

Magna Cum Laude, University of Oregon

2002-2004 Recipient of National Institute of Health Training Grant

2005 Society for Neuroscience Travel Award

2006 Recipient of the Society for Neuroscience Travel Award

2006-2009 Recipient of the Ruth L. Kirschstein National Research Service Award

2008 Recipient of the D.G. Marquis Behavioral Neuroscience Award

2009 Undergraduate Biology Research Program Mentor of the Year Award

2010 Recipient of the D.G. Marquis Behavioral Neuroscience Award

2012 Undergraduate Biology Research Program Mentor of the Year, Honorable Mention

2014 Neuroscience Seminar Data Blitz, voted Best Talk

2015-2017 Exemplary Teaching Award, University of Florida College of Medicine

2016 University of Florida Excellence Award for Assistant Professors

2017 American Psychological Association Early Career Award for Distinguished Contribution in Cognitive and Behavioral Neuroscience

2018 McKnight Brain Institute Leadership Award

2019 Nominated for McKnight Brain Institute Leadership Award

# Teaching

2004 Teaching Assistant for “Neurobiology” undergraduate course, University of Arizona

2006, 08, 11 Teaching Assistant for “Gerontology” undergraduate/graduate course, University of Arizona

2012 Lecturer for “Systems Neuroscience” graduate course, University of Arizona

2014 Lecturer for “Principle of Neuroscience IV” graduate course, University of Florida

2014 Lecturer for “Integrative Aging Physiology” graduate course, University of Florida

2014 Lecturer “Brain Journal Club”, graduate seminar, University of Florida

2014-2015 Lecturer for “Principles of Neuroscience II” graduate course, University of Florida

2014-present Lecturer for “Junior Honors Translational Neuroscience” undergraduate course, University of Florida

2014-present Mentor for Biomedical Sciences 4905, supervised undergraduate research (17 students)

2015-present Lecturer for “Functional Human Neuroanatomy” graduate course, University of Florida

2016-present Course director for “Principles of Neuroscience II” graduate course, University of Florida

2016-present Clinical Neuroanatomy Lecturer and Laboratory Instructor, University of Florida

**Mentorship**

2005-2009 Saman Nematollahi

Undergraduate Student, Honor’s thesis

Project: Representation of three-dimensional objects by the rat perirhinal cortex

2006-2007 Zaneta Navatroliva, Honor’s thesis

Undergraduate student

Project: The effects of memantine of spatial memory in senescent rats

2007-2009 Jenelle Wallace

High school student, Southern Arizona Science and Engineering Fair Winner

Project: The effects of NMDA receptor modulation on perirhinal cortical

neuron activity

2009-2011 Andrea Hartzell

Undergraduate Student, Honor’s thesis

Project: Transcription of the immediate-early gene *Arc* in CA1 of the hippocampus reveals activity differences along the proximodistal axis that are attenuated by advanced age

2014-2015 Jaren Bannerman

Undergraduate student, University of Florida Scholar’s Program

Project: Utilizing computer assisted drafting for the engineering and implantation of high-density mico-electrode arrays

2014-2015 Jordan Reasor

Undergraduate student, University of Florida Science for Life HHMI program

Project: Hippocampal-perirhinal cortical interactions across the lifespan

2014-2015 Amanda Schaerer

Undergraduate student, University of Florida, Honor’s in Psychology

Project: Regional differences in activation of neuronal populations by pattern separation: visualization of neuronal activity in the dentate gyrus and CA3

2014-2016 Patricia Sacks

Undergraduate student, University of Florida Scholar’s Program

Project: The role of acetylcholine in age-related patterns separation deficits

2014-2018 Sean M. Turner

Undergraduate student, University of Florida Scholar’s Program

Project: Hippocampal-cortical interactions in mnemonic discrmination in young and aged rats

2014-present Sarah A. Johnson, Ph.D. **McKnight Brain Inst. Fellowship and K99 recipient**

Postdoctoral research associate, University of Florida, McKnight Brain Institute

Project: Perceptual discrimination deficits underlying age-related cognitive impairment

2015-2018 Abbi R. Hernandez, M.S. **F31 recipient**

Graduate Student, University of Florida Interdisciplinary Program in Biomedical Sciences

Project: The effects of a ketogenic diet on the bi-directional association of cognitive and physical performance

2018-present Abbi R. Hernandez, Ph.D.

Postdoctoral research associate, University of Florida, McKnight Brain Institute

Project: Metabolic interventions for enhancing cognitive resilience in advanced age

2017-present Nicholas DiCola

Graduate Student, University of Florida Interdisciplinary Program in Biomedical Sciences

Project: Age-related alterations in the hippocampal circuit

**Volunteer work**

2008 Mentor and small group leader for University of Arizona Undergraduate Biology Research Program

2010-2011 Society for Neuroscience Membership Survey Advisory Group

2010-2011 Mentor for the University of Arizona Assurance Program

2014 Medical Guild Competition Judge

2014-15 Brain Awareness Week Poster Competition Coordinator and Judge

2015 Judge for speaker competition, Junior Science, Engineering and Humanities Symposium

2014-2016 Mentor HHMI Science for Life mentor

2014-present Mentor University Scholar Program, University of Florida

2015-present Director of Summer Neuroscience Internship Program

2018 Mentor Emerging Scholar Program

# Professional Affiliation

2016-2017 Council on Undergraduate Research (CUR)

2002-present Society for Neuroscience

2014-present Affiliate faculty member, Institute on Aging, University of Florida

2015-present Member of Faculty for Undergraduate Neuroscience (FUN)

**RESEARCH SUPPORT**

Ongoing Research Support

02/01/2019-01/31/2024

NIH/NIA R01AG060977

Title: Metabolic Interventions for Enhancing Cognitive Resilience in Aging and Alzheimer’s Disease

The goal of this award is to determine the mechanisms by which dietary ketosis improves cognition in aged animals.

Role: PI

01/01/16-11/30/20

1R01AG049722, National Institute on Aging

Title: The Contribution of Declines in Functional Connectivity to Cognitive Aging

The major goal of this proposal is to determine how alterations in systems-level neural coordination in old animals produce cognitive impairments.

Role: PI

2017/01/01-2020/12/31

DARPA Targeted Neuroplasticity Training

Cognitive Augmentation through Neuroplasticity

The major goal of this award is to define the mechanisms by which peripheral stimulation of the vagus nerve improves behavioral performance.

Role: co-PI (project leader for Task 1.1)

03/15/2018 - 02/29/2020

NIH/NIA R21AG058240 (multiple-PI with Bizon)

The goal of this award is to determine in the interaction between tau pathology, age, and declines in stimulus discrimination.

Interactions of Perirhinal Tau Pathology and Aging in Cognitive Dysfunction

Role: m-PI

08/15/16-05/30/19 (NCE)

1R21AG051004

Title: Single-Cell Imaging of Functional Connectivity as a Window into Cognitive Aging

The major goal of this award is to develop novel methods for quantifying functional connectivity between memory-associated brain structures in young and aged rats.

Role:PI

2017/02/01-2019/01/31

Florida Department of Health Ed and Ethel Moore Alzheimer’s Disease Research Program

Grant: 7AZ06

Impact of Perirhinal Cortical Tau Pathology on Pre-Clinical Cognitive Decline

Role: co-PI (contact co-PI Jennifer L., Bizon)

The goal of this proposal is to develop and validate a rat model of human tauopathy.

2013/10/01-2019/09/30

0011249, McKnight Brain Research Foundation

Neural system dysfunction and cognitive aging

This goal of this award is to provide institutional support in order to establish a rigorous research program aimed and determining the neurobiological basis of cognitive impairments in the elderly and to identify potential therapeutic strategies.

Role: PI

2016/09/01-2021/06/30

NIH/NIMH R01MH109548 (Maurer, PI)

Title: Testing and forecasting hippocampal theta wave propagation in learning and memory

The goal of this award is to understand the relationship between hippocampal oscillatory dynamics and memory.

Role: co-I

2017/03/31-2022/01/31

NIH/NIA R01AG055544 (Maurer, PI)

Title: Age-associated changes in hippocampal circuits and cognitive function

The goal of this award is to elucidate if age-related alterations in hippocampal activity patterns reflect synaptic dysfunction or adaptive compensation.

Role: Co-I

07/01/2018-06/30/2023

NIH/ NIA 1R01AG060778-01, PI: Bizon

Title: Decision making and basolateral amygdala dysfunction in aging

The goal of this project is to understand how basolateral amygdala dysfunction contributes to altered decision making in aging.

Role: co-I

2018/04/01-2020/04/31

K99AG058786 NIH Pathway to Independence Award (Johnson, PI)

Title: Hippocampal and dopaminergic mechanisms of novelty detection underlying cognitive resilience in aging

The goal of this mentored award is to provide Dr. Johnson with training in neurophysiological recording, analysis and optogenetics and she prepared to transition to research independence.

Role: Mentor

Completed Research Support

2017/04/15-2019/04/30

1F31AG058455, National Institute on Aging (Hernandez, PI)

Title: Metabolic Mechanisms for Treating Cognitive Aging

The goal of this mentored training fellowship is test whether dietary ketosis can improve cognitive function in a pre-clinical model of aging.

Role: Mentor

2015/08/15-2017/05/31

1R03AG049411-01A1, National Institute on Aging (Primary)

Neurogenesis and Memory Network Dynamics during Normal Aging

This proposal seeks to determine the integrity of dentate function in the aged animal.

Role: contact-PI

2015/08/01-2017/3/31

Claude D. Pepper Older Americans Independence Center Junior Scholar Award and Pilot Grant

A Novel Rodent Model of Age-related Motor-Cognition Dual-Task Deficits

The goal of this award is to development a rodent model of the association between motor and cognitive frailty in order to test potential interventions for maintaining positive health outcomes in the elderly.

Role: PI

2016/01/01-2017/3/31

AG047266, sub-Award 1Florida Alzhiemer’s Disease Research Center Pilot Grant

Age-associated functional connectivity declines in the anterior network and memory dysfunction

The goal of this pilot grant is to collect comparable data in rodents and humans that points to the mechanisms of age-related cognitive decline.

Role: contact co-PI

2014/06/01-2016/05/30

00115480, University of Florida Research Seed Opportunity Fund

Neurogenesis and Memory Network Dynamics during Normal Aging

The major goal of this award is to collect pilot data regarding the impact of reduced neurogenesis with age on the changes in activity pattern dynamics within the hippocampus. These data will be used to generate future NIH proposal.

Role: PI

2006/01/09-2009/01/08

F31 NS054465-03, National Institute of Neurological Disorders and Stroke (NINDS)

Aging and Neural Ensembles in the Perirhinal Cortex

Role: PI