

Laura K. Fonken, PhD



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EDUCATION AND TRAINING

2013-2017	Postdoctoral Fellow, University of Colorado Boulder Mentor: Dr. Steven F. Maier
2009-2013	Ph.D. in Neuroscience, Ohio State University Mentor: Dr. Randy J. Nelson
2004-2008	B.S. in Biology and Psychology, Syracuse University Mentor: Dr. Catherine Cornwell

RESEARCH SUPPORT

Ongoing

The role of HMGB1 in the development of late-life depression

Principal investigator: Laura K. Fonken

Agency: Brain & Behavior Research Foundation. Type: NARSAD. Period: 01/15/2016 – 01/14/2018

This project explores the role of neuroinflammation in affective disorders with aging.

Completed

The role of the NLRP3 inflammasome in aging-associated cognitive impairments

Principal investigator: Laura K. Fonken, Mentor: Steven F. Maier

Agency: NIA. Type: F32. Period: 06/01/2014 – 05/31/2017

This study investigated mechanisms mediating heightened neuroinflammatory responses and associated memory impairments that occur in aged animals.

The effects of light at night on cardiac arrest outcome

Principal investigator: Laura K. Fonken, Mentor: Randy J. Nelson

Agency: AHA. Type: Pre-doctoral fellowship. Period: 7/11/2011 – 6/30/2013

This study investigated the role of environmental lighting on recovery following global and focal cerebral ischemia.

HIGHLIGHTED JOURNAL ARTICLES

1) **Fonken, L.K.**, Workman, J.L., Walton, J.C., Weil, Z.M., Morris, J.S., Haim, A., & Nelson, R.J. (2010). Light at night increases body mass by shifting the time of food intake. *Proceedings of the National Academy of Sciences*, 107 (43): 18664-18669.

- 2) **Fonken, L.K.**, Xu, X., Weil, Z.M., Chen, G., Sun, Q., Rajagopalan, S., & Nelson, R.J. (2011). Air pollution impairs cognition, provokes depressive-like behaviors, and alters hippocampal cytokine expression and morphology. *Molecular Psychiatry*. 16 (10): 987-995.
- 3) **Fonken, L.K.** & Nelson, R.J. (2014). The effects of light at night on circadian clocks and metabolism. *Endocrine Reviews* 35 (4): 648-670.
- 4) **Fonken, L.K.**, Frank, M.G., Kitt, M.M., Barrientos, R.M., Watkins, L.R., & Maier, S.F. (2015). Microglia inflammatory responses are controlled by an intrinsic circadian clock. *Brain, Behavior, and Immunity* 45: 171-179.
- 5) **Fonken, L.K.**, Frank, M.G., Kitt, M.M., D'Angelo, H.M., Norden, D.M., Weber, M.D., Barrientos, R.M., Godbout, J.P., Watkins, L.R., & Maier, S.M. (2016). The alarmin HMGB1 mediates age-induced neuroinflammatory priming. *The Journal of Neuroscience* 36 (30): 7946-7956.

JOURNAL ARTICLES

- 6) **Fonken, L.K.**, Finy, M.S., Walton, J.C., Weil, Z.M., Workman, J.L., Ross, J., & Nelson, R.J. (2009). Influence of light at night on murine anxiety- and depressive-like responses. *Behavioural Brain Research*. 205 (2): 349-354.
- 7) Workman, J.L., DeWitt, S.J., **Fonken, L.K.**, & Nelson, R.J. (2010). Environmental enrichment enhances delayed-type hypersensitivity in both short- and long-day Siberian hamsters. *Physiology and Behavior*, 99 (5): 638-643.
- 8) Thomas, N.R., **Fonken, L.K.**, LeBlanc, M., & Cornwell, C.A. (2010). Maternal separation alters social odor preference development in infant mice (*Mus musculus*). *Journal of Comparative Psychology*, 124 (3): 295-301.
- 9) **Fonken, L.K.**, Morris, J.S., & Nelson, R.J. (2011). Early life experiences affect adult delayed-type hypersensitivity in short- and long-photoperiods. *Chronobiology International*, 28 (2): 101-108.
- 10) Bedrosian, T.A., **Fonken, L.K.**, Walton, J.C., & Nelson, R.J. (2011). Chronic exposure to dim light at night suppresses immune responses in Siberian hamsters. *Biology Letters*, 7 (3): 468-471.
- 11) Bedrosian, T.A., **Fonken, L.K.**, Walton, J.C., Haim, A., & Nelson, R.J. (2011). Dim light at night provokes depression-like behaviors and reduces CA1 dendritic spine density in female hamsters. *Psychoneuroendocrinology*, 36 (7): 1062-1069.
- 12) Fenn, A.M.* , **Fonken, L.K.** * , & Nelson, R.J. (2011). Sustained melatonin treatment blocks body mass, pelage, reproductive and fever responses to short day lengths in female Siberian hamsters. *Journal of Pineal Research*, 51 (2): 180-186. *equal contributors
- 13) **Fonken, L.K.**, Xu, X., Weil, Z.M., Chen, G., Sun, Q., Rajagopalan, S., & Nelson, R.J. (2011). Inhalation of fine particulates alters hippocampal neuronal morphology. *Molecular Psychiatry*, 16 (10): 973.

- 14) Workman, J.L., **Fonken, L.K.**, Gusfa, J., Kassouf, K., & Nelson, R.J. (2011). Post-weaning environmental enrichment reduces negative affective responses and interacts with behavioral testing to alter nNOS expression. *Pharmacology, Biochemistry and Behavior*, 100 (1): 25-32.
- 15) **Fonken, L.K.** & Nelson, R.J. (2011). Illuminating the deleterious effects of light at night, *F1000 Med Report* 3: 18.
- 16) **Fonken, L.K.**, Haim, A., & Nelson, R.J. (2012). Dim light at night increases immune function in grass rats, a diurnal rodent, *Chronobiology International*. 29 (1): 26-34.
- 17) Bedrosian, T.A., **Fonken, L.K.**, Demas, G.E., & Nelson, R.J. (2012). Photoperiod-dependent effects of neuronal nitric oxide synthase inhibition on aggression in *Phodopus sungorus*. *Hormones and Behavior*, 61 (2): 176-80.
- 18) **Fonken, L.K.**, Bedrosian, T.A., Michaels, H., Weil, Z.M., & Nelson, R.J. (2012). Short photoperiods attenuate central responses to an inflammogen. *Brain, Behavior, and Immunity*, 26 (4): 617-22.
- 19) **Fonken, L.K.**, Kitsmiller, E., Smale, L., & Nelson, R.J. (2012). Dim nighttime light impairs cognition and provokes depressive-like responses in a diurnal rodent. *Journal of Biological Rhythms*, 27 (4): 319-27.
- 20) **Fonken, L.K.**, Aubrecht, T.G., Meléndez-Fernández, O.H., Weil, Z.M., & Nelson, R.J. (2013). Dim light at night disrupts molecular circadian rhythms and increases body weight. *Journal of Biological Rhythms* 28 (4): 262-71.
- 21) **Fonken, L.K.** & Nelson, R.J. (2013). Dim light at night increases depressive-like responses in male C3H/HeNHsd mice. *Behavioural Brain Research*, 243: 74-78.
- 22) **Fonken, L.K.**, Weil, Z.M., & Nelson, R.J. (2013). Dark nights reverse metabolic disruption caused by dim light at night. *Obesity*, 21 (6): 1159-64.
- 23) Bedrosian, T.A., Herring, K.L., Walton, J.C., **Fonken, L.K.**, Weil, Z.M., & Nelson, R.J. (2013). Evidence for feedback control of pineal melatonin secretion. *Neuroscience Letters*, 542: 123-5.
- 24) **Fonken, L.K.**, Lieberman, R.A., Weil, Z.M., & Nelson, R.J. (2013). Dim light at night exaggerates weight gain and inflammation associated with a high fat diet in male mice. *Endocrinology*, 154 (10): 3817-25.
- 25) **Fonken, L.K.** & Nelson, R.J. (2013). Mice exposed to dim light at night exaggerate inflammatory responses to lipopolysaccharide. *Brain, Behavior, and Immunity*, 34: 159-63.
- 26) **Fonken, L.K.**, Meléndez-Fernández, O.H., Weil, Z.M., & Nelson, R.J. (2014). Exercise attenuates the effects of dim light at night on metabolism. *Physiology and Behavior*, 124: 33-36.
- 27) Lui C.*, **Fonken, L.K.***, Wang, A., Maiseyeu, A., Bai, Y., Wang, T., Maurya, S., Ko, Y., Periasamy, M., Dvonch, T., Morishita, M., Brook, R.D., Harkema, J., Ying, Z., Mukherjee, B., Sun, Q., Nelson, R.J., & Rajagopalan, S. (2014) Central IKK inhibition prevents air pollution mediated peripheral inflammation and exaggeration of type II diabetes. *Particle and Fibre Toxicology*, 11(1): 53. *equal contributors

- 28) Bedrosian, T.A., **Fonken, L.K.**, & Nelson, R.J. (2016). Endocrine effects of circadian disruption. *Annual Review of Physiology*, 78 (1).
- 29) Frank, M.G., Weber, M.D., **Fonken, L.K.**, Hershman, S.A., Watkins, L.R., & Maier, S.F. (2016). The redox state of the alarmin HMGB1 is a pivotal factor in neuroinflammatory and microglial priming: a role for the NLRP3 inflammasome. *Brain, Behavior, and Immunity* 55: 215 - 224.
- 30) **Fonken, L.K.** & Nelson, R.J. (2016). Effects of light exposure at night during development. *Current Opinion in Behavioral Sciences*, 7: 33-39.
- 31) **Fonken, L.K.***, Gaudet, A.D.*, Gaier, K.R.*, Nelson, R.J., & Popovich, P.G. (2016). MicroRNA-155 deletion reduces anxiety- and depressive-like behaviors in mice. *Psychoneuroendocrinology*, 63: 362 - 369. *equal contributors
- 32) **Fonken, L.K.**, Weber, M.D., Daut, R.A., Kitt, M.M., Frank, M.G., Watkins, L.R., & Maier, S.F. (2016). Stress induced neuroinflammatory priming is time of day specific. *Psychoneuroendocrinology*, 66: 82-90.
- 33) Gaudet, A.D.* , **Fonken, L.K.*** , Gushchina, L.V., Aubrecht, T.G., Maurya, S.K., Periasamy, M., Nelson, R.J., & Popovich, P.G. (2016). MicroRNA-155 deletion prevents diet-induced obesity in female mice. *Scientific Reports* 6: 22862. *equal contributors
- 34) **Fonken, L.K.**, Kitt, M.M., Gaudet, A.D., Barrientos, R.M., Watkins, L.R., & Maier, S.F. (2016). Diminished circadian rhythms in hippocampal microglia may contribute to age-associated neuroinflammatory priming. *Neurobiology of Aging*, 47: 102-112.
- 35) Gaudet, A.D., **Fonken, L.K.**, Watkins, L.R., Nelson, R.J., & Popovich, P.G. (2017). microRNAs: Roles in regulating neuroinflammation. *The Neuroscientist*: 1073858417721150.
- 36) Frank, M.G., **Fonken, L.K.**, Annis, J., Watkins, L.R., & Maier, S.F. (2017). Stress disinhibits microglia via down-regulation of CD200: a mechanism of neuroinflammatory priming. *Brain, Behavior, and Immunity*: In press.
- 37) Gaudet, A.D., Ayala, M.T., **Fonken, L.K.**, Smith, E.J., Bateman, E.M., Schleicher, W.E., Maier, S.F., & Watkins, L.R. (2017). Spinal cord injury in rats disrupts bowel function. (Under review).
- 38) **Fonken, L.K.**, Frank, M.G., Gaudet, A.D., D'Angelo, H.M., Daut, R.D., Hampson, E.C., Ayala, M.T., Watkins, L.R., & Maier, S.F. (2017). Neuroinflammatory priming to stress is differentially regulated in male and female rats (Under review).
- 39) Frank, M.G., **Fonken, L.K.**, Dolzani, S.D., Annis, J.L., Siebler, P.H., Heinze, J.D., Schmidt, D., Watkins, L.R., Maier, S.F., & Lowry, C.A. (2017) *M. vaccae* treatment induces an anti-inflammatory milieu in the CNS: attenuation of stress-induced microglial priming, alarmins, and anxiety-like behavior (Under review).
- 40) Sun, Q., Zhang, G., Chen, R., Wang, H., Jiang, A., Li, Z., Li, R., Kong, K., **Fonken, L.K.**, Rajagopalan, S., Sun, Q., & Liu, C. Central IKK2 inhibition ameliorates air pollution mediated hepatic glucose and lipid metabolism dysfunction in mice with type II diabetes (Under review).

41) **Fonken, L.K.**, Bedrosian T.A., Zhang, N., Weil, Z.M., DeVries, A.C., & Nelson, R.J. Dim light-at-night imperils recovery from cerebral ischemia. (Under review).

CONFERENCE PROCEEDINGS

MacGregor, K.L., **Fonken, L.**, Robottom, M., Hyunh, M., & Jorgensen, R.S. (2009). Body mass index is associated with neuropsychological performance in college students. Montreal, Quebec, Canada: Society of Behavioral Medicine Annual Meeting.

Nelson, R.J., Walton, J.C., **Fonken, L.K.**, Workman, J.L., Weil, Z.M., & Haim, A. (2009). Constant light increases body mass and affects immune function. Acre, Israel: International Congress of Applied Chronobiology and Chronomedicine.

Fonken, L.K., Workman, J.L., Walton, J.C., & Nelson, R.J. (2009). Short-term constant light increases body mass in Swiss-Webster mice. East Lansing, MI: Society for Behavioral Neuroendocrinology Annual Meeting.

Workman, J.L., DeWitt, S.J., **Fonken, L.K.**, & Nelson, R.J. (2009). Environmental enrichment enhances immune function in Siberian hamsters. East Lansing, MI.: Society for Behavioral Neuroendocrinology Annual Meeting

Fonken, L.K., Finy, M.S., Walton, J.C., Weil, Z.M., Workman, J.L., Ross, J., & Nelson, R.J. (2009). Influence of light-at-night on murine anxiety- and depressive-like responses. Chicago, IL: Society for Neuroscience Annual Meeting.

Nelson, R.J., Walton, J.C., **Fonken, L.K.**, & Bedrosian, T.A. (2010). Light at night influences immune function. Dublin, Ireland: Psychoneuroimmunology Research Society Annual Meeting.

Fonken, L.K., Workman, J.L., Morris, J.S., Walton, J.C., Haim, A., & Nelson, R.J. (2010). Light at night increases body mass. Vigo, Spain: Conference of the International Society for Chronobiology. * **oral presentation**

Bedrosian, T.A., **Fonken, L.K.**, Walton, J.C., & Nelson, R.J. (2010). Nighttime light exposure influences immune function and affective behavior in female Siberian hamsters. Vigo, Spain: Conference of the International Society for Chronobiology.

Fonken, L.K., Xu, X., Nelson, R.J., Chen, G., Rajagopalan, S., & Sun, Q. (2010). Chronic exposure to ambient particulates leads to cognitive impairments and depression. Toronto, Canada: Society for Behavioral Neuroendocrinology Annual Meeting.

Bedrosian, T.A., **Fonken, L.K.**, Demas, G.E., & Nelson, R.J. (2010). Inhibition of nitric oxide differentially affects photoperiod-induced aggression in Siberian hamsters. Toronto, Canada: Society for Behavioral Neuroendocrinology Annual Meeting.

Morris, J.S., **Fonken, L.K.**, & Nelson, R.J. (2010). Early life stressors suppress delayed-type hypersensitivity in short- and long-days. Toronto, Canada: Society for Behavioral Neuroendocrinology Annual Meeting.

Fonken, L.K., Xu, X., Nelson, R.J., Chen, G., Rajagopalan, S., & Sun, Q. (2010). Chronic exposure to ambient particulates leads to cognitive impairments and depression. San Diego, California: Society for Neuroscience Annual Meeting.

Bedrosian, T.A., **Fonken, L.K.**, Walton, J.C., & Nelson, R.J. (2010). Nighttime light exposure influences immune function and affective behavior in female Siberian hamsters. San Diego, California: Society for Neuroscience Annual Meeting.

Fonken, L.K., Bedrosian, T.A., Zhang, N., Weil, Z.M., DeVries, A.C., & Nelson, R.J. (2011). Impact of light at night on cardiac arrest outcome. Washington, DC: Society for Neuroscience Annual Meeting.

Fonken, L.K., Bedrosian, T.A., Zhang, N., Weil, Z.M., DeVries, A.C., & Nelson, R.J. (2012). Light at night affects cardiac arrest outcome. San Diego, CA. Psychoneuroimmunology Research Society Annual Meeting. ***oral presentation**

Fonken, L.K., Bedrosian, T.A., Zhang, N., Weil, Z.M., DeVries, A.C., & Nelson, R.J. (2012). Light at night affects cardiac arrest outcome. Madison, Wisconsin. Society for Behavioral Neuroendocrinology Annual Meeting. ***oral presentation**

Fonken, L.K., Weil, Z.M., DeVries, A.C., & Nelson, R.J. (2012). Light at night alters outcome to stroke. New Orleans, LA: Society for Neuroscience Annual Meeting.

Fonken, L.K., Frank, M.G., Kitt, M.M., Watkins, L.R., & Maier, S.F. (2014). Microglia possess a circadian clock that controls inflammatory responses independent of glucocorticoids. Washington, DC: Society for Neuroscience Annual Meeting.

Fonken, L.K., Kitt, M.M., Barrientos, R.M., Watkins, L.R., & Maier, S.F. (2015). Diminished circadian rhythms in microglia may contribute to age-related neuroinflammatory sensitization. Seattle, WA: Psychoneuroimmunology Research Society Annual Meeting.

Fonken, L.K., Kitt, M.M., Frank, M.G., Barrientos, R.M., Watkins, L.R., & Maier, S.F. (2015). HMGB1 sensitizes microglia in the aged brain causing prolonged inflammation and cognitive impairments following infection. Chicago, IL: Society for Neuroscience Annual Meeting.

Fonken, L.K. (2016). Circadian regulation of neuroinflammatory priming. Denver, CO: APSS Annual Meeting. ***oral presentation**

Fonken, L.K., Kitt, M.M., Frank, M.G., D'Angelo, H.M., Norden, D.M., Barrientos, R.M., Watkins, L.R., Godbout, J.P., & Maier, S.F. (2016). HMGB1 sensitizes microglia in the aged brain causing prolonged inflammation and cognitive impairments following infection. Montreal, Canada: Society for Behavioral Neuroendocrinology Annual Meeting.

Fonken, L.K., Kitt, M.M., Gaudet, A.D., Barrientos, R.M., Watkins, L.R., & Maier, S.F. (2016). Age-associated circadian dysregulation in rats may sensitize neuroinflammatory responses. San Diego, CA: Society for Neuroscience Annual Meeting.

HONORS AND AWARDS

NARSAD Young Investigator grant, 2016 – 2018
NRSA Postdoctoral Fellowship, 2014 – 2017

Graduation Grant for Leadership in Service, 2013
 Society for Behavioral Neuroendocrinology Young Investigator Award, 2012
 Psychoneuroimmunology Research Society Travel Award, 2012
 1st place Biological Sciences Oral Presentation, Hayes Graduate Research Forum, 2012
 Honorable Mention for Poster Presentation, IBMR Research Day, 2012
 OSUWMC Research Day Poster Award Winner, 2012
 Neuroscience Graduate Studies Program Travel Award, 2012
 American Heart Association Pre-doctoral Fellowship, 2011 – 2013
 Honorable Mention for Oral Presentation, IBMR Research Day, 2011
 International Society for Chronobiology Travel Grant for Students, 2010
 Psychology Department Graduate Student Travel Award, 2010
 3rd place Ohio State Neuroscience Signature Program Poster Day, 2010
 Ohio State University Fellowship, 2009 – 2010
 1st place Syracuse University Annual Undergraduate Poster Session, 2008
 Syracuse University Biology Research Achievement and Academic Excellence Award, 2008
 Syracuse University Allport Research Grant, Fall 2008
 Syracuse University Allport Research Grant, Spring 2008
 Syracuse University Trustees Scholarship Award, 2004 – 2008

INVITED TALKS

2017 University of California Riverside, School of Medicine
 2017 University of Texas, Department of Pharmacology & Toxicology
 2017 Duke University, Department of Psychology & Neuroscience
 2017 McGill University, Centre for Research in Neuroscience
 2016 University of Calgary, Hotchkiss Brain Institute
 2016 Associated Professional Sleep Society Meeting, Symposium
 2016 Colorado Sleep and Circadian Research Symposium
 2014 Artificial Light at Night Meeting
 2014 Associated Professional Sleep Society Meeting, Bench to Bedside Session
 2014 Colorado Sleep and Circadian Research Symposium
 2012 Society for Behavioral Neuroendocrinology, Young Investigator Symposium
 2012 University of Colorado, Department of Psychology & Neuroscience, Maier Laboratory
 2012 Duke University, Department of Psychology & Neuroscience, Bilbo Laboratory
 2011 Ohio State University, Neuroscience Graduate Studies Program Retreat
 2011 Ohio State University, Molecular Virology and Immunology Graduate Program

PROFESSIONAL MEMBERSHIPS

2008 – present	Phi Beta Kappa
2009 – present	The Society for Neuroscience
2009 – present	Society for Behavioral Neuroendocrinology
2010 – 2014	International Society for Chronobiology
2012 – present	Psychoneuroimmunology Research Society
2015 – present	Sleep Research Society

SERVICE AND OUTREACH

2017 NDSEG graduate fellowship reviewer

2017	Grant reviewer for Netherlands Organisation for Scientific Research
2016 – present	Organizer of University of Colorado Undergraduate Neuroscience Journal Club
2015 – present	Organizer of University of Colorado Neuroimmunology Journal Club
2015	Grant reviewer for Natural Environmental Research Council
2012 – 2013	President of Neuroscience Education for Urban and Rural Outreach (NEURO), Ohio State Chapter
2012 & 2013	Brain Awareness Week Lead Student Organizer
2009 – 2013	Brain Awareness Week at Center for Science and Industry
2011 – 2013	Neuroscience Signature Program Poster Day, Student Organizing Committee

JOURNAL REVIEWER

Animal Behavior • Animal Biology • Behavioral Brain Research • Behavioral Processes • Biological Psychiatry • Journal of Biological Rhythms • Brain, Behavior, and Immunity • Chronobiology International • Current Medical Research and Opinion • Environmental Health • Environmental Health Perspectives • Environmental Science & Technology • Hippocampus • Hormones and Behavior • Hormones and Metabolic Research • Hypertension • International Journal of Molecular Sciences • International Journal of Zoology • The Journal of Clinical Endocrinology & Metabolism • Journal of Experimental Zoology Part A • Journal of Mammology • Journal of Neuroinflammation • The Journal of Neuroscience • Journal of Pharmacy and Pharmacology • Journal of Psychopharmacology • Neural Regeneration Research • Neuroimmunomodulation • Neuroscience • Neurotoxicology • Physiology and Behavior • PLOS ONE • Proceedings of the National Academy of Sciences • Proceedings of the Royal Society B • Psychopharmacology • Scientific Reports • Sleep Health • Tissue and Cell • Toxicology Letters

MENTORED STUDENTS AND TECHNICIANS

Heather D'Angelo, 2015 – present

Renata Daniels, 2015 – present

Asni Solomon, 2016 – 2017

Emma Hampson, Summer 2016
Currently: Undergraduate at Bates University

Alyne Rosa Santana, Summer 2015
Currently: Graduate student at University of Sao Paulo

Meagan Kitt, 2013 – 2015
Currently: Graduate student at Case Western Reserve University

Rebecca Lieberman, 2012 – 2013
Currently: Medical student at University of Cincinnati-College of Medicine

Natalie Hood, 2010 - 2011
Currently: Medical student at University of Cincinnati-College of Medicine

Kristopher Gaier, 2012 - 2013
Currently: Medical student at Wright State University

O. Hecmarie Melendez-Fernandez, 2012
Currently: Graduate student at Northwestern University

Emily Kitsmiller, 2010 - 2011
Currently: Graduate student at University of Central Florida

Heather Michaels, 2010
Currently: Professional writer

Dan McCarthy, 2009 – 2010
Currently: Medical student at University of Toledo College of Medicine