
WILLIAM M. KENKEL

wkenkel@udel.edu

<http://www.BESvolelab.com>

Department of Psychological and Brain Sciences
University of Delaware, 105 The Green

Newark, DE 19716

POSITIONS and EDUCATION:

2020 –	Assistant Professor, Psych. & Brain Sci.	University of Delaware
2017 – 2020	Assistant Research Scientist, Kinsey Institute	Indiana University
2018 – 2019	Research Scientist, Neuroscience Institute	Georgia State University
2015 – 2017	Postdoctoral Researcher, Kinsey Institute	Indiana University
2012 – 2015	Postdoctoral Researcher, Psychology	Northeastern University
2007 – 2012	PhD, Neuroscience	University of Illinois at Chicago
2006 – 2007	Intramural Trainee	NICHHD
2002 – 2006	B.A., Psychology <i>cum laude</i>	Cornell University

PUBLICATIONS:

- Kenkel WM**, Gustison M, Beery AK. (2021). Neuroscientist's Guide to the Vole. *Current Protocols in Neuroscience*. (in press).
- Danoff JS, Wroblewski KL, Graves AJ, Quinn GC, Perkeybile AM, **Kenkel WM**, ... Connelly JJ (2021). Genetic, epigenetic, and environmental factors controlling oxytocin receptor gene expression. *Clinical Epigenetics*; (1):23.
- Kenkel WM**. (2020). Birth signalling hormones and the developmental consequences of caesarean delivery. *Journal of Neuroendocrinology*, e12912. doi:10.1111/jne.12912
- Carter CS, **Kenkel WM**, MacLean EL, Wilson SR, Perkeybile AM, Yee JR, . . . Kingsbury MA. (2020). Is oxytocin “Nature’s medicine”? *Pharmacological Reviews*, 72(4), 829-861.
- Kenkel WM**, Perkeybile AM, Yee JR, Pournajafi-Nazarloo H, Lillard TS, Ferguson EF, ... Connelly JJ. (2019). Behavioral and epigenetic consequences of oxytocin treatment at birth. *Science Advances*; 5(5): eaav2244.
- Kenkel WM**. (2019). Corpus Colossal: A Bibliometric Analysis of Neuroscience Abstracts and Impact Factor. *Frontiers in Integrative Neuroscience*; 13(18).
- Kenkel WM**, Perkeybile AM, Yee JR, Carter CS. (2019). Rewritable fidelity: How repeated pairings and age influence subsequent pair-bond formation in male prairie voles. *Hormones and behavior*; 113: 47-54.
- Gasper ER, **Kenkel WM**, Bick J, Rilling JK. (2019). More than just mothers: The neurobiological and neuroendocrine underpinnings of allomaternal caregiving. *Frontiers in Neuroendocrinology*; 53: 100741.
- Perkeybile AM, Carter CS, Wroblewski KL, Puglia MH, **Kenkel WM**, Lillard TS, ... Connelly JJ. (2018). Early nurture epigenetically tunes the oxytocin receptor. *Psychoneuroendocrinology*; 99: 128-36.

- Iriah SC, Trivedi M, **Kenkel W**, Grant SE, Moore K, Yee JR, ... Ferris CF. (2018). Oxycodone Exposure: A Magnetic Resonance Imaging Study in Response to Acute and Chronic Oxycodone Treatment in Rats. *Neuroscience*; 398: 88-101.
- Kenkel WM**, Perkeybile AM, Carter CS. (2017). The neurobiological causes and effects of alloparenting. *Developmental Neurobiology*; 77(2): 214-32.
- Yee JR*, **Kenkel WM***, Kulkarni P, Moore K, Perkeybile AM, Toddes S, ... Ferris CF. (2016). BOLD fMRI in awake prairie voles: A platform for translational social and affective neuroscience. *NeuroImage*. 138: 221-32.
*these authors contributed equally
- Yee JR, **Kenkel W**, Frijling J, Dodhia S, Onishi K, Tovar S, ... Carter CS. (2016). Oxytocin promotes functional coupling between paraventricular nucleus and both sympathetic and parasympathetic cardiorespiratory nuclei. *Hormones and Behavior*. 80: 82-91.
- Madularu D, Kulkarni P, Yee JR, **Kenkel WM**, Shams WM, Ferris CF, Brake WG. (2016). High estrogen and chronic haloperidol lead to greater amphetamine-induced BOLD activation in awake, amphetamine-sensitized female rats. *Hormones and Behavior*. 82: 56-63.
- Kenkel WM**, Yee JR, Moore K, Madularu D, Kulkarni P, Gamber K, ... Ferris CF. (2016). Functional magnetic resonance imaging in awake transgenic fragile X rats: evidence of dysregulation in reward processing in the mesolimbic/habenular neural circuit. *Translational Psychiatry*; 6: e763.
- Kenkel WM**, Carter CS. (2016). Voluntary exercise facilitates pair-bonding in male prairie voles. *Behavioural Brain Research*; 296: 326-30.
- Yee JR, **Kenkel W**, Caccaviello JC, Gamber K, Simmons P, Nedelman M, ... Ferris CF. (2015). Identifying the integrated neural networks involved in capsaicin-induced pain using fMRI in awake TRPV1 knockout and wild-type rats. *Frontiers in Systems Neuroscience*; 9: 15.
- Stewart AM, Lewis GF, Yee JR, **Kenkel WM**, Davila MI, Sue Carter C, Porges SW. (2015). Acoustic features of prairie vole (*Microtus ochrogaster*) ultrasonic vocalizations covary with heart rate. *Physiology & behavior*; 138: 94-100.
- Schoepf I, **Kenkel W**, Schradin C. (2015). Arginine vasopressin in brains of free ranging striped mouse males following alternative reproductive tactics. *Journal of Ethology*; 33(3): 235-42.
- Madularu D, Yee JR, **Kenkel WM**, Moore KA, Kulkarni P, Shams WM, ... Brake WG. (2015). Integration of neural networks activated by amphetamine in females with different estrogen levels: A functional imaging study in awake rats. *Psychoneuroendocrinology*; 56: 200-12.
- MacRae M, **Kenkel WM**, Kentner AC. (2015). Social rejection following neonatal inflammation is mediated by olfactory scent cues. *Brain, Behavior, and Immunity*. 49: 43-8.
- Kulkarni P, **Kenkel W**, Finklestein SP, Barchet TM, Ren J, Davenport M, ... Ferris CF. (2015). Use of Anisotropy, 3D Segmented Atlas, and Computational Analysis to Identify Gray Matter Subcortical Lesions Common to Concussive Injury from Different Sites on the Cortex. *PLOS ONE*; 10(5): e0125748.
- Kenkel WM**, Yee JR, Porges SW, Ferris CF, Carter CS. (2015). Cardioacceleration in alloparents in response to stimuli from prairie vole pups: The significance of thermoregulation. *Behavioural Brain Research*. 286: 71-9.
- Ferris CF, Yee JR, **Kenkel WM**, Dumais KM, Moore K, Veenema AH, ... Carter CS. (2015). Distinct BOLD Activation Profiles Following Central and Peripheral Oxytocin Administration in Awake Rats. *Frontiers in Behavioral Neuroscience*; 9: 245.

- Madularu D, Athanassiou M, Yee JR, **Kenkel WM**, Carter CS, Mumby DG. (2014). Oxytocin and object preferences in the male prairie vole. *Peptides*; 61: 88-92.
- Kenkel WM**, Yee JR, Carter CS. (2014). Is Oxytocin a Maternal-Fetal Signaling Molecule at Birth? Implications for Development. *Journal of Neuroendocrinology*. 26(10): 739-49.
- Kenkel WM**, Suboc G, Sue Carter C. (2014). Autonomic, behavioral and neuroendocrine correlates of paternal behavior in male prairie voles. *Physiology & Behavior*; 128:252-9.
- Ferris CF, Kulkarni P, Toddes S, Yee J, **Kenkel W**, Nedelman M. (2014). Studies on the Q175 Knock-in Model of Huntington's Disease Using Functional Imaging in Awake Mice: Evidence of Olfactory Dysfunction. *Frontiers in Neurology*; 5: 94.
- Schradin C, **Kenkel W**, Krackow S, Carter CS. (2013). Staying put or leaving home: endocrine, neuroendocrine and behavioral consequences in male African striped mice. *Hormones and Behavior*; 63(1): 136-43.
- Pournajafi-Nazarloo H, **Kenkel W**, Mohsenpour SR, Sanzenbacher L, Saadat H, Partoo L, ... Carter CS. (2013). Exposure to chronic isolation modulates receptors mRNAs for oxytocin and vasopressin in the hypothalamus and heart. *Peptides*; 43: 20-6.
- Kenkel WM**, Paredes J, Lewis GF, Yee JR, Pournajafi-Nazarloo H, Grippo AJ, ... Carter CS. (2013). Autonomic substrates of the response to pups in male prairie voles. *PLOS ONE*; 8(8): e69965.
- Kenkel WM**, Paredes J, Yee JR, Pournajafi-Nazarloo H, Bales KL, Carter CS. (2012). Neuroendocrine and behavioural responses to exposure to an infant in male prairie voles. *Journal of Neuroendocrinology*; 24(6): 874-86.
- Pournajafi-Nazarloo H, Partoo L, Yee J, Stevenson J, Sanzenbacher L, **Kenkel W**, ... Carter CS. (2011). Effects of social isolation on mRNA expression for corticotrophin-releasing hormone receptors in prairie voles. *Psychoneuroendocrinology*; 36(6): 780-9.
- Newman JD, **Kenkel WM**, Aronoff EC, Bock NA, Zametkin MR, Silva AC. (2009). A combined histological and MRI brain atlas of the common marmoset monkey, *Callithrix jacchus*. *Brain Research Reviews*; 62(1): 1-18.

FUNDING:

Current

- 2020-'22 Delaware Center for Neuroscience Research COBRE P20 GM103653
 "The role of oxytocin in the association between cesarean delivery and autism spectrum disorders in an animal model"
 Role: PI
 Total award: \$345,468

Completed

- 2019 Georgia State University Brain and Behavior Seed Grant
 "Impact of perigestational opioid exposure on the neural circuitry of social behavior in male and female rats."
 Role: co-PI
 Total award: \$30,000
- 2017 Clinical and Translational Sciences Institute Postdoc Challenge
 Role: Principal Investigator
 Total award: \$5,000

- 2014-'18 National Institute of Child Health and Development P01 HD075750-06
"Developmental consequences of birth interventions"
 Role: Postdoctoral researcher, co-author of grant
- 2009 University of Illinois at Chicago Pre-doctoral training fellowship T-32
 Role: Graduate Student

Previously Submitted

- 2019 National Institute of Child Health and Development R01
"Hormone Signaling at Birth and its Neuroendocrine and Developmental Consequences"
 Role: Principal Investigator
(Submitted October 2019)
- 2018 National Institute of Child Health and Development R01 HD098617 –not funded
"Hormone signaling at birth and social behavior in later life"
 Role: Principal Investigator
- 2017 National Institute of Child Health and Development R21 HD095540 – not funded
"Effects of Antenatal Glucocorticoid Treatment on Birth Signaling Hormones and Offspring Development"
 Role: Principal Investigator
- 2018 National Institute of Child Health and Development K99 HD088672-01A1 – not funded
"Neuropeptides, Birth Signaling and Development"
 Role: Principal Investigator
 Impact score 39

INVITED TALKS:

- International Society for Developmental Psychobiology, Presidential Symposium (2019)
 Emory University, Dept. of Psychology (2019)
 Parental Brain Conference, Toronto (2018)
 University of Illinois, Dept. of Comparative Biosciences (2018)
 Kent State University, Dept. of Biology (2018)
 Bowling Green State University, Dept. of Psychology (2018)
 North Carolina State University, Keck Center Annual Symposium (2018)
 University College Cork, Dept. of Anatomy and Neuroscience (2017)
 Society for Neuroscience, Nanosymposium and Press Conference (2016)
 Harvard Interdisciplinary Oxytocin Research Initiative (2015)
 UC Davis, Dept. of Psychology (2015)
 Indiana University Common Themes in Reproductive Diversity (2013)
 Chicago Chapter of the Society for Neuroscience, graduate student finalist (2012)
 UMass Amherst, Psychology Department (2012)

SERVICE:

- 2020 International Society for Developmental Psychobiology – Conference session moderator
2019- Society for Behavioral Neuroendocrinology – Social media co-chair; Poster judge
2019 *Frontiers in Behavioral Neuroscience* – Review editor
2015-‘18 Indiana University Animal Behavior Conference – Promotions committee; Program art

Ad hoc journal review: *Current Biology*, *Biological Psychiatry*, *Journal of Clinical Investigation*, *Scientific Reports*, *eLife*, *Biology Letters*, *Communications Biology*, *Frontiers in Neuroscience*, *Journal of Neuroendocrinology*, *Psychoneuroendocrinology*, *Physiology and Behavior*, *Hormones and Behavior*, *Behavioural Brain Research*, *American Journal of Primatology*, *Behaviour*, *Behavioural Processes*, *Neuroscience & Biobehavioral Reviews*, *Autism Research*, *Evolution Medicine & Public Health*

Review editor: *Frontiers in Behavioral Neuroscience*

Ad hoc grant review: Austrian Science Foundation (2015)

National Science Foundation (NSF) reviewer, 2020

HONORS and AWARDS:

- 2014 Common Themes in Reproductive Diversity training fellowship (*declined*)
2011 Program Representative to Chicago Society for Neuroscience
2007-'11 UIC University Fellowship

POSTER PRESENTATIONS:

- W.M. Kenkel**, A.M. Perkeybile, J.R. Yee, T. Lillard, C.F. Ferris, C.S. Carter, J.J. Connelly. Behavioral and epigenetic consequences of oxytocin treatment at birth. *Society for Behavioral Neuroendocrinology* (2019).
- W.M. Kenkel**, A.M. Perkeybile, J. Reinhart, C.S. Carter. Prairie voles delivered via cesarean section fail to form pair-bonds as adults. *Indiana University Animal Behavior Conference* (2018).
- W.M. Kenkel**, A.M. Perkeybile, N.D. Crose, A. Daughhetee, R. Gray, J. Reinhart, C.D. Stanton, C.S. Carter. Prairie vole social development affected by prenatal oxytocin exposure. *Indiana University Animal Behavior Conference* (2017).
- W.M. Kenkel**, A.M. Perkeybile, J.R. Yee, C.S. Carter, J.J. Connelly. Developmental consequences of common birth interventions in prairie voles. *International Society for Developmental Psychobiology* (2017).
- W.M. Kenkel**, A.M. Perkeybile, J.R. Yee, T. Lillard, C.S. Carter, J.J. Connelly. Offspring social behavior and thermoregulation following maternal oxytocin administration at birth. *Society for Neuroscience* (2017).
- W.M. Kenkel**, A.M. Perkeybile, J.R. Yee, T. Lillard, C.F. Ferris, C.S. Carter, J.J. Connelly. Developmental consequences in offspring following maternal oxytocin treatment at birth. *Society for Neuroscience* (2016), *Society for Behavioral Neuroendocrinology* (2016), and *Georgia State University Brain and Behavior Retreat* (2016).

- W.M. Kenkel**, A.M. Perkeybile, J.R. Yee, C.S. Carter, J.J. Connelly. A little extra push? Developmental consequences of peripartum oxytocin. Society for Neuroscience (2015).
- W.M. Kenkel**, J.R. Yee, C.S. Carter. The physiology of alloparental care giving behavior in prairie voles. Indiana University Animal Behavior Conference (2015).
- W.M. Kenkel**, A.M. Perkeybile, J.R. Yee, C.S. Carter. Acute effects of maternal oxytocin administration on fetal vole pups. Society for Behavioral Neuroendocrinology (2015) and World Congress for Neurohypophysial Hormones (2015).
- W.M. Kenkel**, J. R. Yee, K. Moore, P. Kulkarni, C.S. Carter, C. F. Ferris. fMRI in the prairie vole: methods development for translational social neuroscience. Society for Neuroscience (2014).
- J. R. Yee, P. Kulkarni, **W. Kenkel**, S. Toddes, M. Nedelman, C. F. Ferris. Studies on a transgenic (zQ175) model of Huntington's disease using functional imaging in awake mice: evidence of huntingtin-associated-protein 1 dysfunction. Society for Neuroscience (2014).
- C. F. Ferris, J. Yee, **W. Kenkel**, P. Kulkarni. Imaging dose-dependent changes in brain activity in awake rats following intraperitoneal oxytocin. Society for Neuroscience (2014).
- W. Kenkel**, J. R. Yee, S. W. Porges, C. F. Ferris, S. Carter. Maternal oxytocin at birth alters offspring behavior. Society for Neuroscience (2013).
- W. Kenkel**, J. Yee, K. M. Gamber, P. Simmons, M. Nedelman, P. Kulkarni, C. F. Ferris. Imaging emotional responses in transgenic Fragile X rats: Evidence of dysfunction in reward processing. Society for Neuroscience (2013).
- J. R. Yee, **W. M. Kenkel**, C. Carter, S. W. Porges, C. F. Ferris. Parallel functional neuroimaging and cardiac autonomic reactivity in the awake prairie vole: A new paradigm for translational investigations of the neural basis of behavior in a socially monogamous rodent. Society for Neuroscience (2013).
- J. R. Yee, **W. Kenkel**, K. Gamber, P. Simmons, M. Nedelman, P. Kulkarni, C. F. Ferris. Identification of imaging biomarkers of pain using fMRI in awake Trpv1 knock-out and wild-type rats. Society for Neuroscience (2013).
- P. P. Kulkarni, **W. Kenkel**, S. Finklestein, M. Ren, M. Nedelman, C. F. Ferris. Use of quantitative anisotropy, 3D segmented atlas and computational analysis to identify subcortical lesions common to diffuse mild traumatic brain injury in rats. Society for Neuroscience (2013).
- C. F. Ferris, T. M. Barchet, S. Toddes, P. Kulkarni, J. Yee, **W. Kenkel**, M. Nedelman. Functional imaging in awake mice: Studies on a transgenic (Q175) mouse model of Huntington's disease. Society for Neuroscience (2013).
- W. Kenkel**, G. Lewis, J. Yee, S. Porges, C. S. Carter. The effects of oxytocin on heart rate and the autonomic nervous system during pup exposure in the male prairie vole. Society for Neuroscience (2012).
- W. Kenkel**, G. Suboc, C. S. Carter. Exercise facilitates pair bonding in prairie voles. Society for Neuroscience (2012).
- J. R. Yee, S. Dodhia, **W. Kenkel**, K. Onishi, J. Frijling, S. W. Porges, C. S. Carter. Oxytocin treatment in prairie voles alters functional neural coupling in non-injected cagemates. Society for Neuroscience (2012).
- W. Kenkel**, What Makes a Babysitter? The neuroendocrine and cardiovascular components of alloparenting in the male prairie vole. Chicago Chapter of the Society for Neuroscience, graduate student competition finalist (2012).

- W. Kenkel**, G. Lewis, J. Paredes, J. Yee, P. Luu, S.W. Porges and C.S. Carter. The Paradoxical Effects of Pup Exposure on Neurohormones and the Autonomic Nervous System in the Male Prairie Vole (*Microtus Ochrogaster*). Society for Neuroscience (2011).
- W. Kenkel**, J. Connelly, E. Erickson and C.S. Carter. Are Birth and Oxytocin Epigenetic Events? Society for Neuroscience (2011).
- J.R. Yee, J. Frijling, M. Saber, H. Pournajafi-Nazarloo, **W. Kenkel**, G. Lewis, S. Tovar, S. Dodhia, K. Onishi, S. Dodhia, S.W. Porges, C.S. Carter. The Effects of Oxytocin Pre-Treatment on Social and Anxiety-Related Behaviors, Functional Neural Connectivity, Hormone Release, and Autonomic Regulation. The 9th World Congress on Neurohypophysial Hormones (2011).
- W. Kenkel**, G. Lewis, J. Paredes, J. Yee, P. Luu, S.J. Porges and C.S. Carter. The Paradoxical Effects of Pup Exposure on Neurohormones and the Autonomic Nervous System in the Male Prairie Vole (*Microtus Ochrogaster*). The 9th World Congress on Neurohypophysial Hormones (2011).
- W. Kenkel**, J. Connelly, E. Erickson and C.S. Carter. The Epigenetic Influence of Oxytocin at Birth. The 9th World Congress on Neurohypophysial Hormones (2011).
- J.R. Stevenson, H. Pournajafi-Nazarloo, J. Van Heusden, J.R. Yee, **W. Kenkel**, C. S. Carter. Paradoxical effects of chronic estrogen treatment on central and peripheral oxytocin in female prairie voles. Society for Neuroscience (2010).
- J.R. Yee, J. Frijling, M. Saber, A. Sterlinski, S. Tovar, L. Barlas, H. Pournajafi-Nazarloo, G. Lewis, J. Stevenson, **W. Kenkel**, S. W. Porges, C. S. Carter. Oxytocin alters the behavioral, cardiovascular, and hormonal responses to a mild daily stressor. Society for Neuroscience (2010).
- W. Kenkel**, J. Paredes, A. J. Grippo, Yee J., Nazarloo H.P., Porges S.W., and Carter, C.S. Pup exposure in male prairie voles facilitates pair bonding, releases oxytocin, activates paraventricular peptidergic neurons and increases heart rate. The Parental Brain Conference IV (2010).
- W. Kenkel**, J. Paredes, A. J. Grippo, H. P. Nazarloo, Porges S.W., and Carter, C.S. Alloparenting in male prairie voles releases oxytocin and elevates heart rate. Society for Neuroscience (2009).
- E. Erickson, **W. Kenkel**, C. S. Carter. Can Pitocin Affect Animal Behavior? Using an Animal Model to Study Midwifery. American College of Nurse Midwives (2009).
- John D. Newman, William M. **Kenkel**, Emily C. Aronoff, Nicholas A. Bock, and Afonso C. Silva. A histological brain atlas of the common marmoset monkey, *Callithrix jacchus*. American Society of Primatologists (2007).

TEACHING EXPERIENCE:

- Instructor, Georgia State University: Introduction to General Psychology
- Co-Instructor, Indiana University: Research and Professional Ethics for the Bio-behavioral Sciences.
- Teaching assistant for graduate / medical courses, University of Illinois at Chicago: Human Neuroanatomy.
- Teaching assistant for undergraduate courses, University of Illinois at Chicago: Introduction to Psychology, 2 sections; Laboratory in Perception; Laboratory in Learning and Conditioning.

MEDIA:

- Society for Neuroscience, 2016, Press Conference on Autism
- Kerry Sheridan, "10 Amorous Animals That Mate for Life", *National Geographic*, Feb. 14, 2016

Gretchen Reynolds, “The ‘Love Hormone’ as Sports Enhancer”, *The New York Times*, Nov. 21, 2012
Adriana Barton, “‘Cuddle hormone’ oxytocin may be key to team sports, study finds”, *The Globe and Mail*, Nov. 22, 2012
The Scorpion and the Frog blog, Nov. 28, 2012

References

Kenkel, W. Birth signalling hormones and the developmental consequences of caesarean delivery. *Journal of Neuroendocrinology*, n/a(n/a), e12912. doi:10.1111/jne.12912