Executive Summary: Edward A. Fox

"Dr. Fox is a renowned scientist in autonomic neuroscience and a superb mentor with a strong training record." - anonymous NIH grant reviewer, Fall 2020

Discovery: The primary focus of Dr. Fox's research has been to understand the development and function of the autonomic nervous system components that sub-serve the interplay between the gut and the brain as pertains to the regulation of food intake and body weight. A better understanding of this system could aid our ability to treat obesity and eating disorders. Progress in delineating the functional neuroanatomy of the gut-to-brain axis, however, had been largely intractable due its complex organization, including intermixing of nerves with different target organs and different functions. He is the only researcher in the world who has been disentangling the functional organization of this system, using novel, innovative genetic approaches he developed. In particular, his lab uncovered genetic controls of development of individual sensory gut-brain pathways that tell the brain about the presence of food in the GI tract; for example, the type, amount and location of nutrients present. He then leveraged this knowledge to independently manipulate each of these pathways to assess their functions in adult rodents. The functions of these pathways were characterized, using sophisticated analyses to identify which of the parameters that describe feeding patterns were altered and how they were altered, and changes in the activation of meal termination circuits in the brain were examined. Dr. Fox has also investigated several aspects of obesity, including how high-energy diets and perinatal overnutrition, which predisposes one to adult obesity, alter feeding regulatory circuits in the brain and gut-to brain axis to induce overeating. He also used parametric analyses of feeding patterns in rodent models of late onset obesity, the most common human obesity, to identify which feeding regulatory circuit(s) was disrupted to produce overeating and obesity. These analyses distinguished the contributions of nerves from the mouth to the brain that mediate meal initiation and palatability and nerves from the gut-to-brain that govern satiation, or meal termination. It cannot be overlooked that the success of several aspects of Dr. Fox's research program resulted from his persistence and creativity in overcoming obstacles that had stood in the way of other top labs in the field pursuing the same goals. For example, Fox's lab developed methods that made possible visualization of the gut-to-brain nerves in microscopic mouse embryos for the first time so their development could be studied. This made possible the study of factors that controlled this development. In turn, these factors were then used to selectively manipulate different sensory pathways. Most recently, his lab has developed a genetic method for visualizing nerve terminals along the entire length of the mouse small intestine mucosa for the first time. Several technical obstacles had previously prevented such visualization. The small intestine mucosa, or inner lining that surrounds the lumen, is where most nutrients are absorbed and from where their absorption is reported to the brain via gut-to-brain nerves. Thus, the ability to visualize these nerves is an important step that will permit overlooked questions about how these nerves sense and distinguish different nutrients to be addressed. Based largely on this research program, Dr. Fox has published 47 peer-reviewed articles and 2 book chapters. A portion of this research program was supported by a 5 year, $1.7 million NIH RO1 grant.

Learning: Dr. Fox has been a trainer on 3 interdisciplinary training grants. He has developed and taught 6 undergraduate (includes introductory through upper level), 6 graduate and 2 mixed undergrad/grad courses revolving around Neuroscience, Behavior and Genetics. He has mentored nearly 75 undergraduates, including Honors, Dean's Scholar and Minority program students. Dr. Fox has supervised 4 Ph.D. students that went to prestigious postdoc programs or an industry job and has served on 8 Master's thesis, 18 preliminary exam, and 13 Dissertation committees.

Engagement: Dr. Fox has served on 8 Department, 4 College, and 7 University committees, many interdisciplinary in nature, and 2 faculty search committees. He chaired the 2nd Ingestive Behavior Research Center Symposium and currently is on Purdue Animal Care and Use-, Psych. Undergraduate-, University Senate-, and University Faculty Affairs committees. He has reviewed grants for the National Science Foundation, the Medical Research Council, and the Prader-Willi Research Foundation.

PART II

GENERAL INFORMATION

a. Academic Appointments

Associate Professor, Department of Psychological Sciences, Purdue University, West Lafayette, IN, 2005 – present

Assistant Professor, Department of Psychological Sciences, Purdue University, West Lafayette, IN, 1999 – 2005

Senior Research Scientist, Department of Psychological Sciences, Purdue University, West Lafayette, IN, 1998 – 1999

Research Associate, Gene Expression Laboratory, Salk Institute for Biological Studies, 1993 – 1994

Postdoctoral Fellow, Neuropharmacology Department, Scripps Research Institute, 1990 – 1992

b. Industrial Positions

Research Scientist, Molecular Biology Department, Megabios/Valentis Corp. 1994 – 1997

c. Awards and Honors

International Travel Award, Purdue HHS (2011, 2015)

United Way Impact Award, College of HHS (2010)

Faculty Fellowship for Study in a Second Discipline (2010)

Top Reviewer, Physiology & Behavior (2007)

International Travel Award, Purdue CLA (2007)

Purdue University Seed for Success Award for Excellence in Research (2005)

International Travel Award, Purdue CLA (2005)

Mathers Foundation Fellow (1993-1994)

Alcohol Research Center Fellow (1990-1993)

Dissertation Research Award, American Psychological Association (1989)

David Ross Summer Fellow (1986, 1987, 1988)

David Ross Fellow, Purdue University (1983-1985)

c. Memberships

American Association for the Advancement of Science
American Neurogastroenterology and Motility Society
International Society for Autonomic Neuroscience
Society for Neuroscience
Society for the Study of Ingestive Behavior

BASIS OF NOMINATION

Section A: DISCOVERY

1. Published Work (asterisk denotes primary author or authors)

a. Refereed Publications

Serlin*[2], H. K. & Fox, E. A., (2021). Neurotrophin-4 is essential for survival of the majority of vagal afferents to the mucosa of the small intestine, but not the stomach. *Autonomic Neuroscience: Basic and Clinical, 233,* 102811.

Serlin*[2], H. K. & Fox*, E. A., (2020). Abdominal vagotomy reveals majority of small intestinal mucosal afferents labeled in na_v1.8cre-rosa26tdTomato mice are vagal in origin. *Journal of Comparative Neurology, 528(5), 816-835.*

Gilland*[2], K. E., **Fox, E. A.**, (2017). Effect of food deprivation or short-term western diet feeding on brain-derived neurotrophic factor protein expression in the hypothalamic arcuate, ventromedial and paraventricular nuclei. *American Journal of Physiology, 312, R611–R625.*

Biddinger*[2], J. E., **Fox, E. A.**, (2014). Reduced intestinal brain-derived neurotrophic factor increases vagal sensory innervation of the intestine and enhances satiation. *Journal of Neuroscience, 34(31), 10379-10393.* **Cover Story.**

Fox*, E. A. (2013). Vagal afferent controls of feeding: a possible role of gastrointestinal BDNF. *Clinical Autonomic Research, 23, 15-31*.

Fox*, E. A., Biddinger[2], J. E., Baquet, Z. C., Jones, K. R., & McAdams, J. (2013a). Loss of Neurotrophin-3 from Smooth Muscle Disrupts Vagal Gastrointestinal Afferent Signaling and Satiation. *American Journal of Physiology, 305, R1307–R1322.*

Fox*, E. A., Biddinger[2], J. E., Jones, K. R., & Worman, A. (2013b). Mechanism of hyperphagia contributing to obesity in brain-derived neurotrophic factor knockout mice. *Neuroscience, 229, 176-199.*

Fox*, E. A. (2012). Treating diet-induced obesity: A new role for vagal afferents? *Digestive Diseases and Sciences, 57(5),* 1115-1117.

Fox*, E. A. & Biddinger[2], J. E. (2012). Early postnatal overnutrition: potential roles of gastrointestinal vagal afferents and brain-derived neurotrophic factor. *Physiology and Behavior, 106(3),* 400-412.

Ratcliffe*, E. M., Farrar, N. & **Fox*, E. A.** (2011). Development of vagal innervation of the gut: steering the wanderer. *Neurogastroenterology and Motility, 23(10),* 898-911.

Biddinger*[2], J. E. & **Fox, E. A.** (2010). Meal parameters and vagal gastrointestinal afferents in mice that experienced early postnatal overnutrition. *Physiology and Behavior, 101,* 184–191.

Fox*, E. A. & McAdams, J. (2010). Smooth muscle-specific expression of neurotrophin-3 in the embryonic and neonatal gastrointestinal tract of the mouse. *Cell and Tissue Research, 340(2),* 267-286.

Murphy*[2], M. C. & **Fox, E. A.** (2010). Mice deficient in brain-derived neurotrophic factor have altered development of vagal gastric sensory innervation. *Journal of Comparative Neurology, 518(15),* 2934-2951.

Fox*, E. A. (2008). Purdue ingestive behavior research center symposium 2007: Influences on eating and body weight over the lifespan – childhood and adolescence. *Physiology and Behavior, 94,* 1-7.

Fox*, E. A. (2008). The labeled line / basic taste versus across-fiber pattern debate: A red herring? *Behavioral & Brain Sciences, 31,* 79-80.

Fox*, E. A. & Murphy[2], M. C. (2008). Factors regulating vagal sensory development: potential role in obesities of developmental origin. *Physiology and Behavior, 94,* 90-104.

Powley*, T. L., Wang, X.Y., **Fox, E. A.**, Phillips, R. J., Liu, L. W. C. & Huizinga*, J. D. (2008). Ultrastructural evidence for communication between intramuscular vagal mechanoreceptors and interstitial cells of Cajal in the rat fundus. *Neurogastroenterology and Motility, 20,* 69-79.

Berthoud*, H. -R., **Fox, E. A.** & Neuhuber, W.L. (2007). Controversial white adipose tissue innervation by the vagus nerve: Seeing is believing. *American Journal of Physiology, 293,* R553-554.

Murphy*[2], M. C. & **Fox, E. A.** (2007). Anterograde tracing method using DiI to label vagal innervation of the embryonic and early postnatal mouse gastrointestinal tract. *Journal of Neuroscience Methods, 163,* 213-225.

Byerly*[2], M. S. & **Fox, E. A.** (2006). High-fat hyperphagia in neurotrophin-4 deficient mice reveals potential role of vagal intestinal sensory innervation in long-term controls of food intake. *Neuroscience Letters, 400,* 240-245.

Fox*, E. A. (2006). A genetic approach for investigating vagal sensory roles in regulation of gastrointestinal function and food intake. *Autonomic Neuroscience: Basic and Clinical, 126 127,* 9-29.

Berthoud*, H. -R., **Fox, E. A.** & Neuhuber, W.L. (2006). Vagaries of adipose tissue innervation. *American Journal of Physiology, 291,* R1240-1242.

Chi*[2], M. M., Fan, G. & **Fox, E. A.** (2004). Increased short-term food satiation and sensitivity to cholecystokinin in neurotrophin-4 knock-in mice. *American Journal of Physiology, 287,* R1044-R1053.

Fox*, E. A. & Byerly[2], M. S. (2004). A mechanism underlying mature onset obesity: evidence from the hyperphagic phenotype of brain-derived neurotrophic factor mutant mice. *American Journal of Physiology, 286,* R994-R1004.

Fox*, E. A., Phillips[2], R. J., Byerly[2], M. S., Baronowsky, E. A., Chi[2], M. M. & Powley, T. L. (2002). Selective loss of vagal intramuscular mechanoreceptors in mice mutant for steel factor, the c-Kit receptor ligand. *Anatomy and Embryology, 205,* 325-342. **Cover Story.**

Fox*, E. A., Phillips[2], R. J., Baronowsky, E. A., Byerly[2], M. S., Jones[3], S. & Powley, T. L. (2001). Neurotrophin-4 deficient mice have a loss of vagal intraganglionic mechanoreceptors from the small intestine and a disruption of short-term satiety. *Journal of Neuroscience, 21,* 8602-8615.

Fox*, E. A., Phillips[2], R. J., Martinson[2], F. A., Baronowsky, E. A., & Powley, T. L. (2001). C-kit mutant mice have a selective loss of vagal intramuscular mechanoreceptors in the forestomach. *Anatomy and Embryology, 204,* 11-26. **Cover Story.**

Fox*, E. A., Phillips[2], R. J., Martinson[2], F. A., Baronowsky, E. A., & Powley, T. L. (2000). Vagal afferent innervation of smooth muscle in the stomach and duodenum of the mouse: Morphology and topography. *Journal of Comparative Neurology, 428,* 558-576.

Fox*, E. A. (2000). The previously identified r3/r5 repressor may require the cooperation of additional negative elements for rhombomere restriction of Hoxb1. *Developmental Brain Research, 120,* 151-164.

Fairman*, J., Roche, L., Pieslak, I., Lay, M., Corson, S., **Fox, E.**, Luong, C., Koe, G., Lemos, B., Grove, R., Fradkin, L., & Vernachio, J. (1999). Quantitative RT-PCR to evaluate in vivo expression of multiple transgenes using a common intron. *Biotechniques, 27,* 566-70, 572-4.

McClarrinon*, M., Gilkey, L., Watral, V., Fox, B., Bullock, C., Fradkin, L., Liggitt, D., Roche, L., Bussey, L. B., **Fox, E.**, & Gorman, C. (1999). In vivo studies of gene expression via transient transgenesis using lipid-DNA delivery. *DNA and Cell Biology, 18,* 533-47.

Thorsell*, A., Wiklund, L., **Fox, E.** & Heilig, M. (1999). Lipid mediated gene delivery in the adult rat brain: quantitative analysis of expression. *Neurochemistry International, 35,* 65-71.

Gorman*, C. M., Aikawa, M., Fox, B., **Fox, E.**, Lapuz, C., Michaud, B., Nguyen, H., Roche, E., Sawa, T., & Wiener-Kronish, J. P. (1997). Efficient in vivo delivery of DNA to pulmonary cells using the novel lipid EDMPC. *Gene Therapy, 4,* 983-92.

McLean*, J. W., **Fox*, E. A.**, Baluk, P., Bolton, P. B., Haskell, A., Pearlman, R., Thurston, G., Umemoto, E. Y., & McDonald, D. M. (1997). Organ-specific endothelial cell uptake of cationic liposome-DNA complexes in mice. *American Journal of Physiology, 273,* H387-404.

Fox*, E. A., & Gruol, D. L. (1993a). Corticotropin-releasing factor suppresses the afterhyperpolarization in cerebellar Purkinje neurons. *Neuroscience Letters, 149,* 103-7.

Fox*, E. A., & Gruol, D. L. (1993b). Ionotropic and metabotropic components of electrophysiological response of cerebellar Purkinje neurons to excitatory amino acids. *Brain Research, 631,* 59-64.

Fox*, E. A., & Powley, T. L. (1992). Morphology of identified preganglionic neurons in the dorsal motor nucleus of the vagus. *Journal of Comparative Neurology, 322,* 79-98.

Berthoud*, H.-R., **Fox, E. A.**, & Powley, T. L. (1991). Abdominal pathways and central origin of rat vagal fibers that stimulate gastric acid. *Gastroenterology, 100,* 627-37.

Berthoud*, H.-R., **Fox, E. A.**, & Powley, T. L. (1990). Localization of vagal preganglionics that stimulate insulin and glucagon secretion. *American Journal of Physiology, 258,* R160-8.

Fox*, E. A., & Powley, T. L. (1989). False-positive artifacts of tracer strategies distort autonomic connectivity maps. *Brain Research Reviews, 14,* 53-77.

Powley*, T. L., **Fox, E. A.**, & Berthoud, H.-R. (1987). Retrograde tracer technique for assessment of selective and total subdiaphragmatic vagotomies. *American Journal of Physiology, 253,* R361-70.

Fox*, E. A., & Powley, T. L. (1986). Tracer diffusion has exaggerated CNS maps of direct preganglionic innervation of pancreas. *Journal of the Autonomic Nervous System, 15,* 55-69.

Powley*, T. L., & **Fox, E. A.** (1986). Vagotomy does not alter circannual body weight cycles in the hibernator Citellus lateralis. *Brain Research, 364,* 159-61.

Fox*, E. A., & Powley, T. L. (1985). Longitudinal columnar organization within the dorsal motor nucleus represents separate branches of the abdominal vagus. *Brain Research, 341,* 269-82.

Sterner*, M. R., **Fox, E. A.**, & Powley, T. L. (1985). A retrograde tracer strategy using True Blue to label the preganglionic parasympathetic innervation of the abdominal viscera. *Journal of Neuroscience Methods, 14,* 273-80.

Fox*, E. A., & Powley, T. L. (1984). Regeneration may mediate the sparing of VMH obesity observed with prior vagotomy. *American Journal of Physiology, 247,* R308-17.

Powley*, T. L., Prechtl, J. C., **Fox, E. A.**, & Berthoud, H.-R. (1983). Anatomical considerations for surgery of the rat abdominal vagus: distribution, paraganglia and regeneration. *Journal of the Autonomic Nervous System, 9,* 79-97.

Corbett*, D., **Fox, E.**, & Milner, P. M. (1982). Fiber pathways associated with cerebellar self-stimulation in the rat: a retrograde and anterograde tracing study. *Behavioural Brain Research, 6,* 167-84.

Impact of Published Work

One assessment of the significance of empirical work published in refereed journals is the journal's impact factor (published by the ISI Web of Science). Listed below are the impact factors for the journals in which Dr. Fox has published in, ranked highest to lowest. This is followed by number of publications in each journal (#), number of citations for each paper with over 40 citations and finally indication of whether those highly cited papers are still being cited. Each "*" indicates Dr. Fox was a primary author on the paper referred to.

Journal	Impact factor	#	Citations (>40)	Cited 2013/2014
Gastroenterology	13.926	1		
Brain Research Reviews	8.79	1*	53*	Yes
Journal of Neuroscience	8.306	2*	51*	Yes

Impact of Published Work (cont.)

Journal	Impact factor	#	Citations (>40)	Cited 2013/2014
Gene Therapy	5.293	1		
Journal of Comparative Neurology	3.848	3***	45*,68*	Yes,Yes
Cell and Tissue Research	3.68	1*		
Behavioral Brain Research	3.33	1		
American Journal of Physiology	3.28	10(6*)	141*,105*,57,51*	All Yes
Neurochemistry International	3.261	1		
Physiology and Behavior	3.16	4****		
Neuroscience	3.122	1*		
Neurogastroenterology and Motility	2.94	2*		
Brain Research	2.879	3***	148*	Yes
Biotechniques	2.67	1		
Journal of Neuroscience Methods	2.484	2**		
DNA and Cell Biology	2.344	1		
Digestive Diseases and Sciences	2.26	1*		
Neuroscience Letters	2.026	2**	61*	No
Developmental Brain Research	1.78	1*		

(over)

Journal	Impact factor	#	Citations (>40)	Cited 2013/2014	Autonomic
Neuroscience 1.85	3**	56	Yes		
(Formerly entitled Journal of the Autonomic Nervous System)					
Clinical Autonomic Research	1.478	1*			
Anatomy and Embryology	1.42	2**	47*,51*	Yes	

These data demonstrate that almost one-third of Dr. Fox's publications have been highly cited (all but two of these he has been the primary author). Moreover, these publications come from all phases of Dr. Fox's career, including graduate student, postdoc, and assistant-associate professor. Thus, these data also indicate that regardless of how long ago these papers were published, they are still being cited. This shows that not only is a significant proportion of his work high impact, but that the impact is long-lived. Additionally, he has published in top tier journals that cover all areas of neuroscience (e.g., Journal of Neuroscience and Brain Research Reviews) as well as numerous of the higher impact specialty journals that focus on one or more of the several areas his highly interdisciplinary research covers (e.g., American Journal of Physiology, which is oriented toward nervous system-physiology-behavior relationships and Journal of Comparative Neurology, which is focused on nervous system connections and structure).

b. Book Chapters

Powley*, T. L., Berthoud, H. -R., Fox, E. A., & Laughton, W. (1992). The dorsal vagal complex forms a sensory-motor lattice: The circuitry of gastrointestinal reflexes. S. Ritter, R. Ritter, & C. D. Barnes (Eds.), *Neuroanatomy and Physiology of Abdominal Vagal Afferents* (pp. 55-80). Boca Raton: CRC Press.

Powley*, T. L., Berthoud, H. -R., Prechtl, J. C., & Fox, E. A. (1991). Fibers of the vagus nerve regulating GI function. Y. Tache & D. L.Wingate (Eds.), *Brain-Gut Interactions*, (pp. 73-82). Boca Raton: CRC Press.

2. Exhibition of Creative Work

Research presented at professional meetings

Fox, E. A. & Lyte, M. (2020, March - cancelled) *Variation in spatial organization of the gut microbiota along the longitudinal and transverse axes of the intestines: Determinitive role of food.* Poster to be presented at the Keystone conference: :A Gut-Systemic Perspective for Metabolic Disease, Santa Fe New Mexico.

Gilland, K. & Fox, E. A. (2019, October). *A Chemogenetic Analysis of the Nucleus Solitary Tract Role in Satiation.* Poster presented at the Annual Meeting of the Society for Neuroscience, Chicago, Illinois.

Serlin, H. K. & Fox, E. A. (2019, October). *Neurotrophin-4 is essential for survival of a large proportion of vagal afferents that innervate the small intestinal mucosa.* Poster presented at the Annual Meeting of the Society for Neuroscience, Chicago, Illinois.

Fox, E. A. & Serlin, H. K. (2019, March). *Neurotrophin-4 is essential for survival of a large proportion of vagal afferents that innervate the small intestinal mucosa.* Poster presented at the Keystone Symposia on Mammalian Sensory Systems, Seattle, Washington.

Serlin, H. K. & Fox, E. A. (2018, July). *Neurotrophin-4 is essential for survival of a large proportion of vagal afferents the innervate the small intestinal mucosa.* Poster presented at the Annual Meeting of the Society for the Study of Ingestive Behavior, Bonita Springs, Florida.

Serlin, H. K. & Fox, E. A. (2017, July). *Vagal afferent innervation of the mouse small intestinal mucosa.* Poster presented at the Annual Meeting of the Society for the Study of Ingestive Behavior, Montreal, Quebec, Canada.

Gilland, K. & Fox, E. A. (2015, October). *Short-term effects of a western diet on the number of brain-derived neurotrophic factor immunoreactive neurons in the hypothalamic arcuate, ventromedial and paraventricular nuclei.* Symposium talk presented at the Annual Meeting of the Society for Neuroscience, Chicago, Illinois.

Fox, E. A., Biddinger, J. E. & McAdams, J. (2015, October). *Smooth muscle-derived neurotrophins regulate development and function of vagal gastrointestinal (GI) afferents.* Poster presented at the Bi-annual meeting of the International Society for Autonomic Neuroscience, Stresa, Italy.

Biddinger, J. E. & Fox, E. A. (2013, November). *Increased vagal sensory neuron and intestinal axon bundle number in mice with smooth muscle- knockout (KO) of brain-derived neurotrophic factor (BDNF) may contribute to augmented intestinal mechanoreceptor innervation and satiation.* Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, California.

Biddinger, J. E. & Fox, E. A. (2012, October). *Effects of smooth-muscle specific deletion of brain-derived neurotrophic factor on vagal afferent innervation of the gastrointestinal tract, feeding behavior and body weight.* Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, Louisiana.

Biddinger, J. E. & Fox, E. A. (2012, July). *Intestinal vagal afferent innervation and meal patterns in mice with peripheral BDNF knockout suggest involvement of vago-vagal gastrointestinal reflexes.* Poster presented at the Annual Meeting of the Society for Ingestive

Behavior, Zurich, Switzerland.

Fox, E. A., Biddinger, J. E., Jones, K. R., Worman, A. & McAdams, J. (2010, November). *Smooth muscle-specific knockout of brain-derived neurotrophic factor results in hyperphagia and obesity.* Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, California.

Biddinger, J. E. & Fox, E. A. (2010, November). *Meal pattern and microstructure changes underlying hyperphagia and obesity in mice with smooth muscle-specific brain-derived neurotrophic factor knockout.* Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, California.

Biddinger, J. E. & Fox, E. A. (2011, November). *Altered feeding patterns of mice with smooth-muscle specific knockout of neurotrophin-3 suggest involvement of vago-vagal gastrointestinal reflexes.* Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, D.C.

Biddinger, J. E., Sharp, A. N. & Fox, E. A. (2009, October). *Effects of early postnatal overnutrition on meal pattern and vagal sensory innervation of the small intestine.* Poster presented at the Annual Meeting of the Society for Neuroscience, Chicago, IL.

Murphy, M. M., & Fox, E. A. (2008, November). *Regulation of vagal sensory development in the murine stomach by brain-derived neurotrophic factor (BDNF).* Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, DC.

Fox, E. A., & McAdams, J. (2008, November). *Smooth muscle-specific expression of neurotrophin-3 (NT-3) in the developing mouse gastrointestinal (GI) tract and its uptake by the vagus nerve.* Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, DC.

Murphy, M. C., & Fox, E. A. (2008, November). *Regulation of vagal sensory development in the murine stomach by brain-derived neurotrophic factor (BDNF).* Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, DC.

Murphy, M. M., & Fox, E. A. (2007, November). *The role of brain-derived neurotrophic factor (BDNF) in development of vagal sensory innervation of the murine stomach.* Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Murphy, M. M., & Fox, E. A. (2006, October). *Method for examining organ- and stage-specific effects of brain-derived neurotrophic factor (BDNF) on vagal innervation of the gastrointestinal (GI) tract.* Poster presented at the Annual Meeting of the Society for Neuroscience, Atlanta, GA.

Fox, E. A. & Jones, K. R. (2005, November). *Brain-derived neurotrophic factor (BDNF) and neurotrophin-3 (NT-3) roles in development of vagal gastrointestinal (GI) afferents.* Short talk presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Fox, E. A., Chi, M. M., Salva, D., & Fan, G. (2004, October). *Neurotrophin-4 knock-in mice with increased vagal intraganglionic laminar endings exhibit an increased sensitivity to CCK.* Short talk presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Murphy, M. M., & Fox, E. A. (2004, October). *Developmental timetables of vagal*

mechanoreceptor innervation of the stomach muscle wall. Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Byerly, M. S., & Fox, E. A. (2003, November). *Age- and diet-dependent perturbations in feeding patterns of BDNF-deficient mice.* Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, LA.

Fox, E. A., Chi, M. M., Salva, D., & Fan, G. (2003, November). *Altered short-term satiety in neurotrophin-4 knock-in mice with increased vagal intraganglionic laminar endings.* Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, LA.

Murphy, M. M., & Fox, E. A. (2003, November). *Anterograde tracing method for postmortem labeling of vagal innervation of the pre- and post-natal murine stomach.* Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, LA.

Fox, E. A. (2003, July). *Interstitial cells of Cajal: potential roles in vagal mechanoreceptor development, maintenance and sensory transduction.* Poster presented at the Meeting on the Enteric Nervous System, Banff, Alberta, Canada.

Chi, M. M., Fox, E. A., Phillips, R. J., Baronowsky, E. A., Fugo, K. R., & Powley, T. L. (2003, July). *Alterations of short-term intake with genetic or surgical vagal manipulations.* Poster presented at the Annual Meeting of the Society for the Study of Ingestive Behavior, Groningen, Netherlands.

Byerly, M. S., & Fox, E. A. (2002, November). *Fat deprivation-induced hyperphagia reveals vagal intestinal afferent role in long-term feeding controls.* Poster presented at the Annual Meeting of the Society for Neuroscience, Orlando, FL.

Fox, E. A., Byerly, M. S., Chi, M. M., Phillips, R. J., & Powley, T. L. (2002, November). *Loss of vagal intramuscular mechanoreceptors in steel mutant mice is associated with altered short-term satiety.* Short talk presented at the Annual Meeting of the Society for Neuroscience, Orlando, FL.

Powley, T. L., Chi, M. M., Phillips, R. J., & Fox, E. A. (2002, April). *Neural tracers identify autonomic losses correlated with altered feeding patterns in mutant mice.* Invited symposium talk presented at the Annual Meeting of the Federation of American Societies for Experimental Biology, New Orleans, LA.

Byerly, M. S. & Fox, E. A. (2001, November). *Intermittent hi-fat access increases fat intake relative to continuous access in mice.* Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Fox, E. A., Byerly, M. S., Jones, S., Boynton, M., Foldes, S. & Powley, T. L. (2001, November). *Loss of vagal IGLE-type mechanoreceptors from the small intestine in neurotrophin-4 deficient mice disrupts short-term satiety.* Poster presented at the Annual Meeting of the Society for Neuroscience, San Diego, CA.

Jones, S., Fox, E.A., & Powley, T. L. (2001, April). *Myenteric neurons are lost in neurotrophin 5 knock-out mice.* Poster presented at the Annual Meeting of the British Neuroscience Association, Harrogate, England.

Fox, E. A., Phillips, R. J., Baronowsky, E. A., & Powley, T. L. (2000, November). *NT-4*

deficient mice have 90% loss of vagal IGLE-type mechanoreceptors in the small intestine. Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, LA.

Fox, E. A., Baronowsky, E. A., Phillips, R. J., & Powley, T. L. (1999, October). *Selective loss of IMA-Type mechanoreceptors in mice mutant for Steel Factor, the c-Kit receptor ligand.* Short talk presented at the Annual Meeting of the Society for Neuroscience, Miami, FL.

Powley T. L., Phillips, R. J., Martinson F. A., Baronowsky, E. A., & Fox, E. A. (1998, November). *Vagal afferent terminals in the mouse stomach: types and topographies.* Poster presented at the Annual Meeting of the Society for Neuroscience, Los Angeles, CA.

Fox, E. A., Baronowsky, E. A., Phillips, R. J., Martinson F. A., & Powley, T. L. (1998, November). *Selective loss of gastric tension receptors in c-KIT mutant mice.* Poster presented at the Annual Meeting of the Society for Neuroscience, Los Angeles, CA.

Fox, E. A., Baronowsky, E. A., Phillips, R. J., Martinson, F. A. & Powley, T. L. (1998, July). *Vagal sensory innervation of the gastric fundus is selectively disrupted in c-KIT mutant mice.* Poster presented at the International Symposium on Brain-Gut Interactions, San Diego, CA.

McClarrinon, M. K., Fox, B. P, Fox, E. A., Sawa, T., Shanks, R. M., Wiener-Kronish, J. P., & Gorman, C. M. (1996, December). *Fluorescent visualization of cellular uptake and compartmentalization of cationic lipid:DNA complexes in vitro and in vivo*. Poster presented at the Annual Meeting of the American Society for Cell Biology, San Francisco, CA.

Thorsell, A., Fox, E. & Heilig, M. (1996, November). *Lipid-mediated gene transfer in the rat brain*. Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, DC.

Roche, E., Fox, E. & Gorman, C. M. (1996, September*). In vivo gene expression following IV delivery of Lipid/DNA complexes,* Poster presented at the Gene Therapy Meeting, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.

Sawa T, Fox E, Fox B, Gorman C, Miyazaki H, Wiener-Kronish J.P. (1996, May). *The use of specific lung cell promoters to achieve selective gene delivery in the lung.* Poster presented at the International Meeting of the American Thoracic Society, New Orleans, LA.

Fox, E.A., Roche, L., McClarrinon, M. and Gorman, C.M. (1995, March-April). *CFTR gene therapy: in vivo and in vitro expression.* Poster presented at the Keystone Symposium on Gene Therapy, Steamboat Springs, CO.

Fox, E.A. and O'Gorman, S. (1994, November). *Regulatory elements that direct expression of Hoxb-1 gene to rhombomere four of the hindbrain during midgestation.* Poster presented at the Annual Meeting of the Society for Neuroscience, Miami Beach, FL.

Fox, E.A., Roche, L., McClarrinon, M. and Gorman, C.M. (1994, December). *CFTR gene therapy: in vivo and in vitro expression.* Poster presented at the Annual Meeting of the American Society for Cell Biology, San Francisco, CA.

Fox, E.A. and Gruol. D.L. (1992, October). *Comparison of cultured cerebellar Purkinje neuron responses to quisqualate, AMPA, ACPD and AMPA+ACPD*. Poster presented at the Annual Meeting of the Society for Neuroscience, Anaheim, CA.

Fox, E.A. and Gruol. D.L. (1991, November). *Mechanisms of CRF depression of quisqualate response in cultered cerebellar Purkinje neurons.* Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, LA.

Fox, E.A., Di Julio N.M., and Gruol. D.L. (1990, October-November). *CRF and alpha-adrenergic agonists modulate excitatory amino acid responses in cultured cerebellar purkinje neurons.* Poster presented at the Annual Meeting of the Society for Neuroscience, St. Louis, MO.

Powley, T.L., Berthoud, H.-R., Fox, E.A., Prechtl, J.C., Carlson, N. and Wang, F.B. (1990, June) *Vagal vagaries: topographic organization of the dorsal motor nucleus of the vagus.* 33rd Annual Meeting of Canadian Federation of Biological Societies, Dalhousie University, Halifax, Nova Scotia.

Fox, E.A. and Powley, T.L. (1989, October-November). *The morphology of functionally identified preganglionic neurons in the dorsal motor nucleus of the vagus.* Poster presented at the Annual Meeting of the Society for Neuroscience, Phoenix, AZ.

Powley, T.L., Berthoud, H.-R., Prechtl, J.C., and Fox, E.A. (1989, July) *Fibers of the vagus nerve regulating GI function.* International Symposium on Brain-Gut Interactions, Cambridge, England.

Fox, E.A. and Powley, T.L. (1988, November). *Dendritic fields and morphology of identified neurons in the dorsal motor nucleus of the vagus.* Poster presented at the Annual Meeting of the Society for Neuroscience, Toronto, Ontario, Canada.

Powley, T.L., Fox, E.A. Baronowsky, E., Keller, D.L. and Berthoud, H.R. (1987, November). *Longitudinal column of gastric branch neurons in the dorsal motor nucleus of the vagus is composed of subcolumns corresponding to distal divisions of gastric branch.* Poster presented at the Annual Meeting of the Society for Neuroscience, New Orleans, LA.

Berthoud, H.R., Fox, E.A., and Powley, T. L. (1986, November). *Neural control of glucagon and insulin secretion: role for hepatic and gastric vagal branches in the rat.* Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, D.C.

Powley, T.L., Fox, E.A., and Berthoud, H.R. (1986, November). *Selective as well as total subdiaphragmatic vagotomies can be assessed with a sensitive and versatile tracer technique.* Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, D.C.

Fox, E.A., Baronowsky, E., and Powley, T.L. (1986, November). Brainstem organization of vagal nuclei and fiber pathways in the rat. Poster presented at the Annual Meeting of the Society for Neuroscience, Washington, D.C.

Powley, T.L., Fox, E.A., Prechtl, J.C. and Berthoud, H.R. (1986, July). *Structural and functional organization of rat vagal efferents affecting feeding behavior.* Paper presented at the IXth International Conference on the Physiology of Food and Fluid Intake, Seattle, WA.

Fox, E.A., and Powley, T.L. (1985, October) *Tracer diffusion from injection sites distorts organ innervation maps: limiting diffusion prevents labeling of vagal preganglionic neurons after true blue injections in the pancreas.* Poster presented at the Annual Meeting of the Society for Neuroscience, Dallas, TX.

Fox, E.A., Tumeo, F.A., and Powley, T.L. (1984, October). *Separate subdiaphragmatic vagal*

branches originate from different longitudinal columns of the dorsal motor nucleus of the vagus. Poster presented at the Annual Meeting of the Society for Neuroscience, Anaheim, CA.

Fox, E.A., and Powley, T.L. (1983, November). *Vagal regeneration may mediate the sparing of VMH obesity observed with prior vagotomy.* Poster presented at the Annual Meeting of the Society for Neuroscience, Boston, MA.

Powley, T. L., Prechtl, J. C., Fox, E. A., and Berthoud, H.-R. (1983, March). *Anatomical considerations for surgery of the rat abdominal vagus: distribution, paraganglia and regeneration.* Conference on Vagal Nerve Function: Behavioral and Methodological Considerations, Santa Ynez, CA.

3. Invited talks at professional meetings and educational institutions

Fox, E.A. (2020, September – canceled due to COVID). *Organ-specific regulation of survival of vagal afferents that supply the gastrointestinal tract.* Workshop on Gut-Brain Communication in Metabolic Control and the Regulation of Homeostasis, Ascona, Switzerland.

Fox, E.A. (2015, June). *To eat or not to eat: the gut-brain axis and appetite.* Integrative Neuroscience Program, Purdue University, West Lafayette, IN.

Fox, E.A. (2015, July). *Growth factor regulation of development and function of vagal sensory innervation.* IUPUI Medical Center, Indianapolis, IN.

Fox, E.A. (2011, September). *A role for gastrointestinal brain-derived neurotrophic factor in metabolic and autonomic regulation.* 7th Congress of the International Society for Autonomic Neuroscience, Buzios, Brazil.

Fox, E.A. (2011, May). *Hyperphagia and obesity in mice with smooth muscle-specific KO of brain-derived neurotrophic factor.* Division of Hypothalamic Research and Touchstone Diabetes Center, Texas Southwestern Medical School, Dallas, TX.

Fox, E.A. (2011, July). *Vagal gastrointestinal afferents in early postnatal overnutrition.* Annual meeting of the Society for the Study of Ingestive Behavior, Clearwater, FL.

Fox, E. A. (2010, August). *Neurotrophin regulation of vagal gastrointestinal afferents.* Joint International Neurogastroenterology and Motility Meeting, Boston, MA.

Fox, E. A., & Murphy, M. C. (2007, April). *Nerve growth factors, vagus nerve development and regulation of food intake.* Ingestive Behavior Research Center Symposium, Purdue University, West Lafayette, IN.

Fox, E. A., & Murphy, M. C. (2007, October). *Neurotrophin regulation of development of vagal innervation of the gastrointestinal tract.* 5th Congress of the International Society for Autonomic Neuroscience, Kyoto, Japan.

Fox, E. A., & Murphy, M. C. (2005, July). *Investigation of vagal sensory roles in regulation of gastrointestinal function and food intake using targeted gene manipulations.* 4th Congress of the International Society for Autonomic Neuroscience, Marseille, France.

Fox, E. A. (2003, April). Genetic strategy reveals sensory pathways involved in the regulation of food intake, Department of Molecular and Integrative Physiology, University of Illinois, Champagne, IL.

Fox, E. A. (1999, September). Genetic dissection of sensory pathways that regulate food intake and body weight, Department of Chemistry, Purdue University, West Lafayette, IN.

Fox, E. A. (1997, March). *Efficient in vitro and in vivo delivery of DNA to pulmonary cells using the novel lipid EDMPC*. Palo Alto Medical Foundation Research Institute, Palo Alto, CA.

Fox, E., Michaud, B., Aikawa, M., McClarrinon, M., Fox, B. & Gorman, C. (1996, April). *In vitro - in vivo comparison of DNA delivery via lipid/DNA complexes*. Gene Therapy Meeting, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.

Fox, E.A. (1995, June). *CFTR expression after aerosol delivery of lipid/DNA complexes to the primate airway*. Cystic Fibrosis Foundation Meeting, Williamsburg, VA.

Fox., E.A. (1994, February). *Regulation of cerebellar Purkinje neuron excitability by corticotrophin releasing factor and glutamate*. Department of Pharmacology, University of Texas, Lubbock, TX.

Fox., E.A. (1994, February). *Organization of regulatory elements targeting Hoxb-1 transcription to rhomobomere 4 of the embryonic hindbrain*. Pennington Biomedical Research Center, Baton Rouge, LA.

Fox., E.A. (1994, February). *Organization of regulatory elements targeting Hoxb-1 transcription to rhomobomere 4 of the embryonic hindbrain*. Molecular Biology Department, MegaBios Corp., Burlingame, CA.

Fox., E.A. (1994, January). *Organization of regulatory elements targeting Hoxb-1 transcription to rhomobomere 4 of the embryonic hindbrain*. Department of Psychology, Texas Woman's University, Denton, TX.

Fox, E.A. (1993, January). *Corticotrophin releasing factor regulation of vagal GI function.* Department of Psychology, University of Pennsylvania, Philadelphia, PA.

Fox, E.A. (1991, April). *Cerebellar Purkinje neuron responses to excitatory amino acids and corticotrophin releasing factor.* Neuroscience Program and Department of Biological Sciences, University of Southern California, Los Angeles, CA.

Fox, E.A. (1990, February). *The morphology of functionally identified preganglionic neurons in the dorsal motor nucleus of the vagus*. Neurobiology Unit, Scripps Institute of Oceanography, San Diego, CA.

Fox, E.A. (1989, January). *The morphology of functionally identified preganglionic neurons in the dorsal motor nucleus of the vagus.* Rockefeller University, New York, NY.

4. Involvement in Purdue graduate research program

a. Major Professor for student theses

Ph.D. Dissertations:

Serlin, Hannah K., "Characterization of Vagal Afferent Innervation in the Gastrointestinal Tract of Neurotrophin-4 Knock-out Mice as a Tool to Investigate Organ-specific Contribution to the Regulation of Food Intake*"* 2020. Published in Autonomic Neuroscience: Basic and Clinical in 2021. (see "refereed publications").

Gilland, Kaitlyn E., "Chemogenetic & Optogenetic Methods for Studying the Role of the Nucleus Solitary Tract in Satiation" 2019.

Biddinger, Jessica E., "Smooth-muscle specific removal of Brain-derived neurotrophic factor results in increased vagal afferent innervation of the intestine and increased satiation in mice." 2013. Published in Journal of Neuroscience, 2014. (see "refereed publications").

Murphy, Michelle C., "The role of brain-derived neurotrophic factor in the development of vagal innervation of the gastrointestinal tract." 2008. Published in Journal of Comparative Neurology in 2010. (see "refereed publications").

Master's Theses:

Serlin, Hannah K., "A genetic approach to pinning down the wanderer: Mapping vagal afferent innervation of the mouse intestinal mucosa*"* 2017. Published in Journal of Comparative Neurology in 2020. (see "refereed publications").

Gilland, Kaitlyn E., "Short-term effects of a western diet on the number of brain-derived neurotrophic factor immunopositive neurons in the hypothalamic arcuate, ventromedial and paraventricular nuclei." 2015. Publication in American Journal of Physiology, Regulatory and Comparative in 2017. (see "refereed publications").

Biddinger, Jessica E., "Effects of early postnatal overnutrition on meal patterns and vagal sensory innervation of the small intestine." 2009. Published in Physiology and Behavior in 2010. (see "refereed publications").

Murphy, Michelle C., "Anterograde tracing method using DiI to label vagal innervation of the pre- and postnatal murine stomach." 2005. Published in Journal of Neuroscience Methods in 2007. (see "refereed publications").

b. Significant consultation with graduate student research

Served on thesis/preliminary exam committees for the following students:

Major professor:

Mardi Byerly	Neuroscience (Psychology)
Michelle Murphy	Psychobiology (Psychology)
Susan Roy	Psychobiology (Psychology)
Jessica Biddinger	Behavioral Neuroscience (Psychology)
Serena Ostrander	Behavioral Neuroscience (Psychology)
Kaitlyn Gilland	Behavioral Neuroscience (Psychology)
Hannah Serlin	Behavioral Neuroscience (Psychology)
Melinda Karth	Behavioral Neuroscience (Psychology)

Fatemeh Fatahi	Behavioral Neuroscience (Psychology)

Master's Theses:

Amanda Bolbecker	Psychobiology (Psychology)
Alicia Doerflinger	Psychobiology (Psychology)
Scott Kanoski	Learning and Memory (Psychology)
Sara Hargrave	Behavioral Neuroscience (Psychology)
Crystal (Soojeong) Ji	Behavioral Neuroscience (Psychology)
Matthew Powers	Behavioral Neuroscience (Psychology)
Alisha Aroor	Behavioral Neuroscience (Psychology)
Brent Bachman	Behavioral Neuroscience (Psychology)
Arbaaz Mukadam	Behavioral Neuroscience (Psychology)
Brent Bachman	Behavioral Neuroscience (Psychology)

Preliminary Exams:

Amanda Bolbecker	Psychobiology (Psychology)
Alicia Doerflinger	Psychobiology (Psychology)
Corrinne Lim	Psychobiology (Psychology)
Jai Li	Behavioral Neuroscience (Psychology)
Sara Hargrave	Behavioral Neuroscience (Psychology)
Matthew Powers	Behavioral Neuroscience (Psychology)
Kristen Breit	Behavioral Neuroscience (Psychology)
Deborah Shelley	Neuroscience (Biology)
Jennifer Jensen	Neuroscience (Basic Medical Sciences)
Michael Chi	Neuroscience (Psychology)
Lisa Nichols	Neuroscience (Psychology)
Ryan Spalding	Neuroscience (Psychology)
Gary Walter	Neuroscience (Psychology)
Tien-Jui Lee	Interdepartmental Nutrition (Psychology)
Quiyu (Rachel) Wu	Neuroscience (Biology)
Nicole Schartz	Neuroscience (Psychology)
Elizabeth Sahagun	Neuroscience (Psychology)
Michelle Karth (Chair)	Behavioral Neuroscience (Psychology)
Alicia Aroor	Behavioral Neuroscience (Psychology)

Ph.D. Dissertations:

Amanda Bolbecker	Psychobiology (Psychology)
Alicia Doerflinger	Psychobiology (Psychology)
Corrinne Lim	Psychobiology (Psychology)
Jai Li	Behavioral Neuroscience (Psychology)
Lindsey Scheir	Behavioral Neuroscience (Psychology)
Deborah Shelley	Neuroscience (Biology)
Jennifer Jensen	Neuroscience (Basic Medical Sciences)
Michael Chi	Neuroscience (Psychology)
Lisa Nichols	Neuroscience (Psychology)
Ryan Spalding	Neuroscience (Psychology)
Gary Walter	Neuroscience (Psychology)
Tien-Jui Lee	Interdepartmental Nutrition (Psychology)
Nicole Schartz	Neuroscience (Psychology)

5. Research grants and awards received
a. External Grants

Agency: Foundation for Prader-Willi Research
Title of Grant: Chemogenetic dissection of the neural mechanisms that control meal size
Duration of funding (Dates): 1 year (4/19 – 3/20; no cost extension – 3/21)
Total amount of award: $76,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: N/A

Agency: National Institutes of Health
Title of Grant: Interdisciplinary training in signals controlling ingestion and obesity
Duration of funding (Dates): 3 years (8/1/16 – 7/31/19)
Total amount of award: $250,000
Role: Trainer
If Co-PI, for how much of the total funding are you directly responsible: N/A

Agency: National Institutes of Health
Title of Grant: Interdisciplinary training in signals controlling ingestion and obesity
Duration of funding (Dates): 5 years (8/1/12 – 7/31/16)
Total amount of award: $484,550
Role: Trainer
If Co-PI, for how much of the total funding are you directly responsible: N/A

Agency: National Institutes of Health
Title of Grant: Interdisciplinary training in signals controlling ingestion and obesity
Duration of funding (Dates): 5 years (8/1/08 – 7/31/12)
Total amount of award: $396,450
Role: Trainer
If Co-PI, for how much of the total funding are you directly responsible: N/A

Agency: National Institutes of Health
Title of Grant: Genetic remodeling of vagal afferent organization
Duration of funding (Dates): 5 years (6/05 – 5/10)
Total amount of award: $1,700,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: N/A

Agency: United States Department of Agriculture
Title of Grant: Interdepartmental Nutrition Program at Purdue Fellowship application in the discipline of nutrition and the area of obesity and diet
Duration of funding (Dates): (5 years) 11/1/06– 10/31/10
Total amount of award: $76,500
Role: Trainer
If Co-PI, for how much of the total funding are you directly responsible: N/A

Agency: National Science Foundation
Title of Grant: Louis Stokes Alliance for Minority Participation
Duration of funding (Dates): Summer 2007, Fall 2007, Spring 2008
Total amount of award: N/A

Role: Co-Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: $815, $396, $396

Agency: College of Liberal Arts Staff Development Fund
Title of Grant: Vagal sensory innervation of the gastric fundus is selectively disrupted in c-kit mutant mice.
Duration of funding (Dates): 1 year (1998)
Total amount of award: $450
Role: PI
If Co-PI, for how much of the total funding are you directly responsible: N/A

b, External Research Contracts

Agency: Iowa State University, Professor Mark Lyte
Title of Contract: Method for staining bacteria and vagal sensory nerve terminals in the small intestine that makes possible study of their anatomical relationship.
Duration of funding (Dates): 1 year (11/15 – 11/16) with option for second year.
Total amount of award: $50,000/year
Role: Principal Investigator

c. Internal Grants

Agency: Integrative Neuroscience Program.
Title of Grant: Chemogenetic dissection of brain satiation pathways.
Duration of funding (Dates): July 2016 – June 2017.
Total amount of award: $15,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: NA

Agency: Office of the Executive Vice President for Research and Partnerships, Office of the Provost, Purdue University
Title of Grant: New NIH R01/U01/P01 Program**.**
Duration of funding (Dates): December 2015 – December 2016.
Total amount of award: $26,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: NA

Agency: Office of the Executive Vice President for Research and Partnerships, Office of the Provost, Purdue University
Title of Grant: NIH Visit (to attend NIH council meetings and meet with Program Officers)**.**
Duration of funding (Dates): January 2016.
Total amount of award: Up to $1,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: NA

Agency: Purdue Research Foundation and College of Health and Human Sciences
Title of Grant: International Travel to ISAN (International Society for Autonomic Neuroscience) 2015, Stressa, Italy.
Duration of funding (Dates): September 25 – 30, 2015
Total amount of award: $1600
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: NA

Agency: Purdue Research Foundation and College of Health and Human Sciences
Title of Grant: International Travel to 7th Congress of the International Society for Autonomic Neuroscience, Buzios, Brazil.
Duration of funding (Dates): September 5 – 9, 2011
Total amount of award: $1400
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: NA

Agency: Purdue Research Foundation and College of Liberal Arts
Title of Grant: International Travel to 5th Congress of the International Society for Autonomic Neuroscience, Kyoto, Japan.
Duration of funding (Dates): October 15 – 19, 2007
Total amount of award: $1400
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: NA

Agency: Purdue Research Foundation and College of Liberal Arts
Title of Grant: International Travel to 4th Congress of the International Society for Autonomic Neuroscience, Marseille, France
Duration of funding (Dates): July 12 – 16, 2005
Total amount of award: $1400.
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: NA

6. Current research interests

Our research focuses on brain-gut interactions mediated by the numerous sensory autonomic pathways important for regulating eating and body weight. Each pathway signals different information about food in the gut. Our goal is to determine what information each pathway carries, where it goes in the brain, and how the brain utilizes the information.

Dramatic changes in feeding behavior such as obesity, bulimia and anorexia involve increases or decreases in the size of eating bouts (meals/snacks). Some of the most important information for the control of meal size is carried from the upper GI tract to the brain by the sensory component of the vagus nerve. This tells the brain about the food accumulating in the stomach and upper intestine as one eats and is important in stopping eating. While nutrients absorbed into the bloodstream from the GI tract can influence food intake and body weight over the long term, they are only a minor component directly regulating meal size because little is absorbed by the time a meal is concluded. Therefore, the signaling from upper gut to the brain may be disrupted in obesity and in eating disorders associated with altered meal size. For that reason, a major research interest of the Fox lab over the last 18 years has been to better understand the inputs from the upper GI tract to the brain – what information do they carry and how does the brain use that information. The functional-anatomical organization of the vagus nerve, which appears to mediate the bulk of gut-to-brain signaling, is complex, carrying many sensory and motor pathways that control many organs. Because this organization is poorly understood, we developed genetic research tools (for example, gene knockouts targeted to specific parts of the GI tract) to manipulate individual sensory pathways and in the last few years have been applying these tools successfully – we have begun to tease apart the functional organization of vagal sensory pathways.

One newer research area involves the vagal sensory pathways that taste the food inside the GI tract during eating and digestion. The genetic tools we developed for the studies described above focused on

pathways that sense stretch and tension in the smooth muscle of the GI tract, for example, associated with peristalsis or expansion from filling with food. One of the great mysteries is how food is "tasted" by the vagal nerves in the GI tract as nutrients are absorbed from the intestinal lumen into the mucosa (e.g., How are sugars, fats and amino acids distinguished? How is the detection of these nutrients altered in obesity, anorexia, etc.?). Answering these questions will be a key step in developing treatments for obesity and eating disorders. We have been developing animal models using recently available genetic tools that will be invaluable in making breakthroughs in this field.

A second research area being developed is pursuing potential biological explanations for the difficulty so many people have in staving off weight gain. In particular, we are investigating how environmental causes such as ready availability of high energy foods (e.g., high-fat high carbohydrate diets) alter the brain in ways that may make people feel continually hungry even though they have excess calories stored in fat already. For example, high-energy foods may change the levels of neurotransmitters in the brain that control eating – but in the wrong direction! We are interested in determining the time course of these effects as well as how these diets change the neurotransmitter levels so that we can try to prevent it from happening as a possible therapeutic strategy.

Our newest area of research is an extension of the first area described above – trying to decipher functional-anatomical organization of gut – brain communication through the vagus nerve in control of meal size. It is well known that activation of vagal sensory innervation of the upper gut excites neurons in the brainstem and this ultimately leads to inhibition of feeding. Surprisingly, however, the mechanisms by which excitation of these neurons inhibit feeding are poorly understood. A better understanding of the neural system that controls meal size will be an essential aid in the development of a treatment for dietary obesity. A first step to solving this mystery will be to better understand these brainstem neurons. The reason this has not been done is because significant barriers have prevented progress. Thus, we are developing a novel system that we believe can overcome these barriers. This system takes advantage of newly available genetic systems that allow experimenter controlled manipulation of brain cells that are excited during a behavior – in our case during consumption of a meal. We will use specific excitation of these cells to see if we activate them ourselves, can we also inhibit feeding (reduce meal size). If this works, then we can use the same systems to follow these neurons further in the brain, hopefully to eventually figure out how they inhibit feeding. This knowledge might provide a means to develop treatments for obesity and eating disorders. One of these systems, chemogenetics, takes advantage of designer receptors activated by designer drugs (DREADDs – "man" or "person"- made receptors that can be genetically placed in specific type of brain cells). These DREADDs, and thus the neurons that have them, can then be selectively excited by giving animals a drug and the effects on feeding can be examined. The second system uses ion channels from bacteria that are sensitive to light and when activated by the right kind of laser light these can also excite the neurons that have them. For this system a very fine cable is implanted in the desired brain region to aim light at the neurons of interest that have the light-sensitive ion channels. We are still in the early stages of setting these systems up in our neurons of interest, but appear to be beginning to have success. We are working in collaboration with Alex Chubykin in Biology as he is an excellent electrophysiologist who has worked with these chemogenetic and optogenetic systems and he will be recording activity of our neurons of interest.

7. Evidence of interdisciplinary activity

- Participant in Integrative Program in Neuroscience (now PULSe) activities
    - Received Grant to collect pilot data with Biology lab (2015)
    - Presented in Seminar series (2015)
    - Organizing Special Lectures course for Spring 2019 "Neuroscience of Obesity"
    - Taught Special lectures in Neuroscience course 4 semesters/topics
    - Graduate Admissions Committee (2000-2001)

- Graduate Curriculum Committee (2001-2009)
- Executive Committee (2003-2006)
- Mentor to one graduate student
- Served on committees of 6 students
- Several first year grad students have done their rotations in Dr. Fox's lab
- Participated in graduate student recruitment
- Regularly attended and contributed posters/presentations to annual retreat

- Participant in Ingestive Behavior Research Center activities
  - One of 4 professors that developed the Ingestive Behavior Research Center
  - Ingestive Behavior Research Center Executive Committee (2004-2010)
  - Chair, Ingestive Behavior Research Center Symposium Committee (2007)
  - Mentored first graduate student to receive PhD with specialization in Ingestive Behavior Research Center, and all Dr. Fox's grad students since have participated in this Center's graduate program
  - Grad student supported by Ingestive Behavior Research Center training grant
  - Participated in numerous Ingestive Behavior Research Center activities, including journal club, seminars and symposia.

- Participant in Interdepartmental nutrition program activities
  - Served on a graduate student committee

- Co-PI on 2 MURI (Multiple University Research Initiative) grants (one received 2nd highest score, but only the top grant was funded)
  - Mediation of stress through gut microbiota-autonomic-brain axis
  - Involves coordination of anatomical, physiological and behavioral research and new technologies in molecular biology to identify bacterial genomes, and development of CMOS microchips for real time imaging of bacterial neurotransmitter secretion.
  - Involves collaboration with Animal Science and Veterinary Medicine labs at Purdue to transfer our neuroanatomical methods to the study of stress and immune system function in pigs as a translational step.

- Co-PI on 2 internal grants originating from the EVPRP with the intent of fostering interdisciplinary research that were funded, one from the Integrative Neuroscience Program and the other from the New NIH R01/U01/P01 Program. The grants were entitled "Chemogenetic dissection of brain satiation pathways".
  - This is a collaboration with the lab of Alexander Chubykin in Biological Sciences to develop novel technology for selective identification and manipulation of neurons activated during feeding and involved with satiation, or meal termination.
  - Involves combination of Chubykin's experience with electrophysiology in vivo and in brain slices and chemogenetics with Fox's experience in the anatomy and function of peripheral and central autonomic neural systems and their role in feeding behavior. The goal is to understand neural control of meal size and develop means to control meal size as it is a fundamental component of obesity, anorexia and bulimia.

8. Other evidence of national and international recognition

Grant reviews: National Science Foundation
Medical Research Council, UK
UTSA Pew Biomedical Scholars

Foundation for Prader-Willi Syndrome Research

Journal Editor: Guest Editor, Special Issue of Physiology & Behavior: Ingestive Behavior Research Center Symposium 2007: "Influences on Eating and Bodyweight over the Lifespan: Childhood and Adolescence"

Journal reviews for: American Journal of Physiology, Appetite, Autonomic Neuroscience, Brian Research, Brain Research Bulletin, Cells Tissues Organs, Developmental Dynamics, Digestive Diseases and Sciences, European Journal of Neuroscience, Frontiers in Physiology, Gastroenterology, Histochemistry and Cell Biology, International Journal of Developmental Neuroscience, Journal of Comparative Neurology, Journal of Histochemistry and Cytochemistry, Journal of Physiology, Molecular Metabolism, Nature Reviews Gastroenterology and Hepatology, Neurogastroenterology and Motility, Neuroscience, Neuroscience Letters, Physiology and Behavior, PLOS One, Regulatory Peptides, Science

Text Reviews: "Psychology", 7th Ed. by David Myers, Worth Publishers, Chapter 3: The Nature and Nurture of Behavior

"Physiology of Behavior", 9th Ed. by Neil R. Carlson, Allyn & Bacon

"Biopsychology", 7th Ed. by John P.J. Pinel, Allyn & Bacon

"Foundations of Physiological Psychology", 7th and 8th Eds. by Neil R. Carlson, Allyn & Bacon

Section B: LEARNING

1. Courses Taught During Past Three Years

PSY 352	Neuropsychology
PSY 390	Behavioral Neuroscience Research
PSY 422	Genes & Behavior
BIOL 294, 394, 494	Behavioral Neuroscience Research
BIOL 497 & 499	Honors Research in Biology
PSY633, 62101	Seminar in Genes, Brain & Behavior
PSY 633	Special Lectures in Neuroscience of Obesity (new course; one time 2019)
PSY 515	Neuroscience of Consciousness (new course 2021)
PSY ???	Honors Research in Psychology

2. Contributions in Course and Curriculum Development

Dr. Fox has developed 14 courses, 6 undergraduate, 6 graduate, and 2 mixed graduate and undergraduate, each taught with varying frequency from one – ten times. One of the undergraduate courses was a behavioral neuroscience lab course. Most recently, Dr. Fox has developed a new course, Neuroscience of Consciousness (PSY 515), currently being taught. The summer and Fall before last, Dr. Fox developed and then in the Spring he taught a one-time Special Lectures in Neuroscience Graduate Course as part of the Purdue Interdisciplinary Institute for Neuroscience entitled "The Neuroscience of Obesity".

3. Preparation of Instructional Materials

Dr. Fox has prepared numerous overhead, slide and powerpoint presentations for lectures, study guides, in and out of class assignments and exams, laboratory materials, experiments and readings.

4. Special activities that have contributed to teaching effectiveness

Dr. Fox has participated in the College Teaching Workshops series offered by the Center for Instructional Excellence.

5. Experimentation in teaching methods and techniques

Dr. Fox feels strongly student participation in the learning process is critical to their ability and motivation to learn difficult material. Moreover student and student-professor interaction may be important in this process. Therefore, he has tried several different in class activities that involve student participation and interaction, continually modifying the more successful ones based on student feedback at the midpoint and end of the semester. Some examples: 1) Have groups of students work together to develop analogies to help understand difficult concepts, present analogies to class and have class vote on best analogy each class; award extra credit on each exam to the group with the highest cumulative score over the classes leading up to the exam. 2) Before class students read a science paper on a topic covered in class and identify important aspects of the paper such as its strengths and weaknesses. In class they meet in groups to discuss and pick what they think are the most important points (e.g., strengths and weaknesses) and each group presents theirs to the class, leaving some time for a general class discussion of what each group presented. 3) Discuss research paper in class. Before class each student does an assignment. For example, they identify 2 aspects of the paper they are curious about but don't understand, write out a question asking about this and then try to answer the question using any resources they want. They also identify 2 terms they do not understand and find definitions for them. This assignment provides them with questions and information they can bring to the in class discussion of the paper and helps them learn how to read a research paper. 4) Students present research papers in class based on a guideline that Dr. Fox provides them. Answering the questions in the guideline help them to learn how to read a research paper. 5) Dr. Fox has students read a chapter each week in a book with controversial ideas that are complementary to the course material and write a one page commentary or reaction to some aspect of the chapter. Then the chapter and student reactions is discussed in class. This can stimulate discussion among the students to a surprising degree - depending on the particular class.

6. Student Recognition and Evidence of Impact

a. Quantitative indicators of teaching effectiveness

The table below lists ratings for CIE-based student evaluations of Dr. Fox's teaching for the past three years. University Core Items 1 and 2 are answered on a 5-point scale that ranges from (1) very poor to (5) excellent. Additional items are answered on a 5-point scale that ranges from (1) strongly disagree to (5) strongly agree.

University Core items (discontinued 2020):

1. Overall, I would rate this course as:
2. Overall, I would rate this instructor as:

Additional items (2019):

3. My instructor demonstrates the importance and significance of the subject matter.
4. My instructor seems well prepared for class.

5. My instructor appears interested in teaching.
6. My instructor encourages an atmosphere where ideas can be exchanged freely and easily
7. My instructor is open to student questions.
8. My instructor shows respect for diverse groups of peoples.

Additional items (2021):

3. The instructor clearly explains the material so I can understand it.
4. The instructor is open to my questions and effectively answers them.
5. The instructor seems to care that I learned this material.
6. The instructor willingly takes time to help other students and me.
7. The instructor is fair and consistent in evaluating my performance.
8. The instructor created an inclusive learning environment.

Course Number	PSY 35200			PSY 42200			PSY 633	PSY 62101		PSY 515
Semester and Year	S19	S20	S21	F19	F20	F21	S19	S18	S20	S21
Enrollment	34	32	38	33	28	44	7	5	7	14
Number of respondents	28	27	35	28	25	43	5	3	4	10
My instructor demonstrates…	4.6		4.2	4.5		4.6	4.7	4.8		4.6
My instructor seems well…	4.5		4.6	4.7		4.4	4.7	4.8		4.7
My instructor appears…	4.5		4.3	4.7		4.3	4.7	4.8		4.6
My instructor encourages…	4.9		4.4	4.9		4.2	4.9	4.8		4.2
My instructor is open to…	4.8		4.6	4.9		3.8	4.7	5.0		4.7
My instructor shows respect…	4.5		4.4	4.7		4.3	4.9	4.8		4.6
Instructor core**	4.6			4.6			4.7	5.0		
Course core*	4.6			4.0			4.7	4.3		

b. Qualitative indicators of teaching effectiveness

Dr. Fox supervises undergraduate research as well as graduate research. In less than 21 years nearly 75 undergraduate students have trained in Dr. Fox's lab, including 6 honors students (Psychology, Biology and Foods & Nutrition honors programs), 5 Deans scholars, and 3 minority program students (LSAMP and MARC AIM). Additionally, some of these students and others have done readings (PSY391) with Dr. Fox, some as part of the honors program but others not. In the lab students have learned everything from bench work (e.g., molecular biology, histology), to physiological studies (e.g., brain region activation by feeding), to neuroanatomy (processing animal tissues, staining nerve cells and other cell types and analyzing staining), to carrying out behavioral studies (e.g., meal pattern and meal microstructure feeding behavior studies and data analysis). Many of these students have gone on to graduate school or medical school, or to work in Industry.

7. Teaching grants received

Agency: Purdue University College of Liberal Arts International Travel Grant
Title of Grant: Funding for instructional computing/Laboratory in Genes & Behavior

Duration of funding (Dates): One year, 2001
Total amount of award: $14,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: N/A

Section C: ENGAGEMENT

1. Translating research information

Dr. Fox worked along with the University News Service after they received a press release from Nature journals about his cover article in the Journal of Neuroscience. This resulted in interviews that led to a story about the research involved in Purdue Today, The Exponent and a broadcast on WBAA. This publicity led to two collaborations on campus and discussions about possible collaboration with two gastroenterologists at IU Med Ctr. This included Dr. Fox being invited to give a seminar July 1, 2015.

2. University or departmental administrative service

Department of Psychological Sciences service activities:

Advisory Committee	(2000-2001)
Graduate Policy Committee	(2000-2011)
Developmental Faculty Search Committee	(Fall 2001)
Awards and Admissions Committee	(Spring 2005)
Social Area Faculty Search Committee	(Fall 2011)
Industrial/Organizational Area Faculty Search Committee	(Fall 2011)
Promotion/Tenure Counseling Committee	(Fall 2011, 2018)
Teaching Excellence Committee	(2011- 2017)
Graduate Committee	(Spring 2018)
Animal Care Coordinator	(2017-18; 2018-19; 2019-20)
Purdue Animal Care and Use Committee	(2020 - 2023)
Undergraduate Committee	(2021 -)

Colleges of Liberal Arts and Health and Human Sciences service activities:

Psychology Representative to Senate, College of Liberal Arts	(Fall 1999)
Curriculum Committee, College of Liberal Arts	(2001-2003)
Nominations and Elections Committee, College of Liberal Arts	(2006-2008)
United Way Senior Chair, College of Health and Human Sciences	(2010)

University service activities:

Graduate Admissions Committee, Integrative Program in Neuroscience	(2000-2001)
Academic Organization Committee, Purdue University	(2001-2006)
Graduate Curriculum Committee, Integrative Program in Neuroscience	(2001-2009)
Long-Term Planning Committee, Purdue University	(Spring 2002)
Executive Committee, Integrative Program in Neuroscience	(2003-2006)
Ingestive Behavior Research Center Executive Committee	(2004-2010)
Chair, IBRC Symposium Committee	(2006-2007)
University Senate	(2015-2018; Spring 2022)
University Student Affairs Committee	(2015-2018)
University Faculty Affairs Committee	(Spring 2022)

FORM 36 ADDENDUM EDWARD A. FOX

Manuscripts in review

Fox, E. A., & Lyte, M. Variation in spatial organization of the gut microbiota along the longitudinal and transverse axes of the intestines. Accepted with revision by Archives of Microbiology

Research grants submitted

a. External Grants

Agency: NIH
Title of Grant: Chemogenetic dissection of the neural control of satiation.
Duration of funding (Dates): 5 years (10-22 – 9/27)
Total amount of award: $1,895,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: N/A

Agency: Foundation for Prader-Willi Research
Title of Grant: Chemogenetic dissection of the neural mechanisms that control meal size
Duration of funding (Dates): 1 year (4/21 – 3/22)
Total amount of award: $108,000
Role: Principal Investigator
If Co-PI, for how much of the total funding are you directly responsible: N/A
Renewal Not funded

Patents

PRF-64341.00.WO; BHGL-12264-432; "SYSTEM FOR AUTOMATING ANIMAL TESTING PROTOCOLS" PCT Application filed 060810, Joe Garner, Ed Fox and Michelle Murphy

Teaching Experience (Course instructor)

	Course	*Semester/Year*
PSY 515	Neuroscience of Consciousness	Spring 2021
PSY 352	Neuropsychology	Spring 2016, 2017, 2018, 2019, 2020, 2021, 2022
PSY 591	Neuroscience of Consciousness	Spring 2015

Teaching Experience (Course instructor; continued)

PSY 62101	Seminar in Genes, Brain & Behavior	Spring 2012, 2014, 2016, 2018, 2020, 2022
PSY633	*Special Lectures in Neuroscience*	*Spring 1999, 2000, 2001, 2010, 2019*
PSY422	Genes & Behavior	Fall 1999, 2000, 2001, 2002, 2003, 2004, Spring 2007, Spring 2013, Fall 2014, Spring 2015, Fall 2015, 2016, 2017, 2019, 2020,2021
PSY322	Brain & Behavior	Spring 2000, 2001, 2002, 2003
PSY492	Psychology Internship:	Summer 2001, Spring 2004, Fall 2007, Spring 2009 Fall 2012, Spring 2013
PSY323,323L	Laboratory in Psychobiology	Fall 2001
PSY222	Fundamental Psychobiology	Fall 2002, Spring 2003 Fall 2003, Spring 2004 Fall 2004, Spring 2005 Spring 2008, 2009, Fall 2009, Fall 2011

Direction of Undergraduate (and Graduate) Research

Graduate Neuroscience Lab Rotations:			
		Ryan Spalding	Spring 2005
		Valerie Green	Spring 2006
PSY690:		Mardi Byerly	Spring 2001
PSY498	Senior Thesis:	Rebekah Holmes	Fall 2000 & Spring 2001
PSY498	Honors Research:	Nina Hernandez	Fall 2012
PSY404/5	Honors Research:	Andrea Powers	Spring 2005–Spring 2006
F&N397/497	Honors Project:	Christine Wilker	Fall 2008 & Spring 2009
BIOL 499	Honors Research:	Kaitlyn Gilland	Fall 2010; Spring, Fall 2011
BIOL 499	Honors Research:	Kun Lin	Fall 2017; Spring 2018
Phillips Summer Internship – Biology		"	Summer 2017
BIOL 499	Honors Research	Steven Carlson	Fall 2019; Spring 2020, Fall 2020
Phillips Summer Internship – Biology		Taylor Dal Bon	Summer 2018
P. U. Summer Stay Fellowship		Emily Willis	Summer 2019
PSY498 Honors Research		Roni Heyman	Spring 2022-

Direction of Undergraduate (and Graduate) Research (continued)

Dean's Scholars:	Marcella Boynton	Spring 2000
	Camille Leamon	Spring 2001
	Matt Bruno	Spring 2001
	Julia Tibbetts	Spring 2001
	Sarah Gilles	Spring 2005
MARC AIM:	Mardi Byerly	Summer 2000
LSAMP (Louis Stokes Alliance for Minority Participation)		
	Remila Triumph	Summer 2007
	Brittney Tribble	Fall 2007, Spring 2008 & Summer 2008
PSY390: (BIOL294, 394,494)	Jorgito Alvarez	Summer 1999
	Sean Gruver	Fall 1999
	Angie Royce	Fall 1999 & Spring 2000
	Jennifer Kaleta	Summer & Fall 2000
	Marcella Boynton	Fall 2000 & Spring 2001
	Camille Leamon	Fall 2001 & Spring 2002
	Julia Tibbetts	Spring 2002
	Olga Shebanov	Fall 2001
	Nick Foster	Fall 2001 & Spring 2002
	Matt Adams	Spring 2002
	Lindsay Backs	Spring 2005
	Karlis Janelsins	Summer & Fall 2005 & Spring 2006
	Kiet Ma	Spring 2006
	Chelsea Holmes	Fall 2005 & Spring 2006
	Emmanuel Monge	Spring 2007
	Lexie Conway	Spring 2007
	Kaylee Yost	Fall 2007 & Spring 2008
	Jessica Grubaugh	Summer & Fall 2008 & Spring & Fall, 2009
	Amanda Sharp	Fall 2008 & Spring 2009
	Calais Williams	Fall 2008 & Spring 2009
	Samantha Hawkins	Fall 2007, Spring 2008 & 2009, Fall 2009, Spring 2010
	Juyoung Park	Fall 2009
	Taylor Hurt	Fall 2009, Spring 2010
	Kaitlyn Gilland	Summer & Fall 2010
	Anastasia Klaus	Fall 2010; Spring, Fall 2011, Spring 2012
	Laura Cutler	Summer, Fall 2011, Spring 2012
	Victoria Gerber	Spring, Summer, Fall 2012
	Carly Marshall	Summer 2012
	Leslie Marshall	Fall 2012, Spring 2013
	Shreeyah Raman	Fall 2013, Spring, Fall 2014 Fall 2015
	Goldie Razaban	Fall 2013, Spring 2014, Fall 2015

Direction of Undergraduate (and Graduate) Research (continued)

	Abbey Toren	Fall 2015
	Kun Lin	Fall 2016, Spring 2017, Spring 2018
	Taylor Dal Bon	Spring, Summer, Fall 2017, Spring 2018, Fall 2018
	Ananya Swaroop	Spring, Fall 2017, Spring, Fall 2018
	Andrew Kaskie	Spring, Summer, Fall 2017, Spring, Fall 2018
	Rebecca Sterner	Summer, Fall 2017, Spring 2018
	Ruhani Sansoya	Spring 2018
	Aimee Stramowski	Fall, Spring 2018
	Madalyn Deselem	Fall 2018, Spring, Fall 2019, Spring 2020
	Steven Carlson	Spring, Fall 2019, Spring 2020
	Griffin Marslender	Spring, Fall 2019
	Emily Willis	Spring, Summer, Fall 2019
	Sophie Forrow	Spring, Fall 2021, Spring 2022
	Brittney Graebner	Spring, Fall 2021, Spring 2022
Internship:	Alison Surdo	Summer 1999
PSY391 Readings:	Rebekah Holmes	Summer 2000
	Nina Hernandez	Spring 2012
	Whitney Grooms	Fall 2012
Volunteer:	Matt Adams	Spring & Summer 2001
	Amy Pressler	Summer & Fall 2001
	Olga Shebanov	Spring 2001
	Nick Foster	Summer 2001
	Dennis Stansbury	Summer 2002
	Katherine Shafer	Spring, Summer, Fall 2002, Spring, Summer 2003
	Marcella Boynton	Fall 2002, Spring 2003
	Jeannie Lerch	Spring, Summer 2005
	Matthew Le	Summer 2005
	Erin Annesley	Summer & Fall 2006
	Joanne Towers	Summer 2009–Summer 2010
	Logan Pankrats	Fall 2010, Spring 2011
	Julian Hankins	Fall 2011
	Nina Hernandez	Fall 2011