

SHOSHANA EITAN, PH.D.

ASSOCIATE PROFESSOR

Behavioral and Cellular Neuroscience • Department of Psychological and Brain Sciences
Texas A&M University • College Station, TX 77843

Positions and Employment:

- 1997-2000 Trainee, Norman Cousins Center of Psychoneuroimmunology, UCLA, Los Angeles, CA -
Rothschild Foundation Scholar
- 2000-2002 Post-Doctoral Fellow, Neuropsychiatric Institute, UCLA, Los Angeles, CA
- 2002-2005 Assistant Researcher, Neuropsychiatric Institute, UCLA, Los Angeles, CA
- 2005-2013 Assistant Professor, Behavioral and Cellular Neuroscience, Department of Psychology,
Texas A&M University, College Station, TX
- 2008-present Faculty Member, Texas A&M Institute for Neuroscience (TAMIN), College Station, TX
- 2013-2017 Associate Professor, Behavioral and Cellular Neuroscience, Department of Psychology,
Texas A&M University, College Station, TX
- 2017-present Associate Professor, Behavioral and Cellular Neuroscience, Department of Psychological
and Brain Sciences, Texas A&M University, College Station, TX

Education:

- 1997 Ph.D. in Neurobiology, Clore Distinguished Scholar, Neurobiology Department, Weizmann
Institute of Science, Rehovot, Israel – Clore Distinguished Scholar for Graduate Students
- 1992 M.Sc. in Neurobiology, Neurobiology Department, Weizmann Institute of Science, Rehovot,
Israel – Wolf Prize Award for Master Students
- 1990 B.A. in Biology, Open University, Tel-Aviv, Israel

Professional Experiences and Memberships:

- 1992- present Society of Neuroscience
- 2005- present Society of Neuroscience, Texas A&M chapter
- 2005- present Member of the Graduate Faculty at Texas A&M University
- 2008- present Faculty of Neuroscience, Texas A&M Institute for Neuroscience
- 2009 Texas A&M-CONACYT: Collaborative Research Grant Program Review Committee
- 2013-present Editorial Board member, Pain Studies and Treatment (PST)
- 2014-15 PESCA Peer Review Committee

Research Interests:

- I. Understanding the effects of psychosocial environment and stress on drug abuse, with specific focus on the vulnerabilities of adolescents to opioid abuse. Epidemiological studies clearly demonstrate the existence of psychosocial effects on drug use in humans. Over the last few years, we have analyzed differences between cage-mates of group-housed adolescent and adult rodents (i.e. when drug-naïve and drug-treated animals were housed together). Analyzing differences in behavior and neurochemistry represents a novel approach to understanding how social interactions can affect drug use in adolescents. Our recent studies clearly demonstrate that social housing conditions alter morphine dependence, sensitization and reward (acquisition and extinction). Furthermore, our recent studies demonstrate that social housing conditions also alter the analgesic (pain relieving) effects of opioids. Lastly, our most recent study showed a marked effect of social environmental on morphine-induced gene expression in the stratum.

- II. Examining the differential effects of various opioids and how it relates to beneficial and adverse consequences. Recent studies suggest that different opioid analgesics (opioid agonists) can engage different downstream signaling within the cell, despite binding to and activating the same receptor. Our recent studies demonstrate that various opioids will differentially modulate the responses through the D2DRs. Moreover, at equianalgesic doses, various opioids have differential effects on the activity of signaling molecules. Lastly, in a recent study, we observed a marked difference between opioids in their effects on gene expression. Different opioids alter the expression of different genes with surprisingly very little overlap. Put together these studies strongly imply that various opioids have differential effects on the functionality of the dopaminergic system, on signaling through the dopaminergic system, and on the expression of genes - all of which are expected to have differential effects on depression, anxiety, and/or alcohol abuse.
- III. Improving pain management across ages and genders. Opioids are commonly used for the management of moderate-to-severe pain. Given the differential effects of various opioids, we examine their differential effects in the ability to reduce burn pain. These studies demonstrate that, generally, burn trauma reduces the antinociceptive potency of opioids. Surprisingly, among all opioids tested, hydrocodone was most effective in suppressing burn-induced Hyperalgesia.

PUBLICATIONS (In Chronological Order)

*Students and research assistants under my mentorship are underlined

Eitan S, Zisling R, Cohen A, Belkin M, Hirschberg DL, Lotan M, Schwartz M., “Identification of an interleukin 2-like substance as a factor cytotoxic to oligodendrocytes and associated with central nervous system regeneration”, *Proceedings of the National Academy of Sciences of the USA (PNAS)*. 1992; 89(12):5442-6.

Eitan S, Schwartz M., “A transglutaminase that converts interleukin-2 into a factor cytotoxic to oligodendrocytes”, *Science*. 1993; 261(5117):106-8.

Sivron T, **Eitan S**, Schreyer DJ, Schwartz M., “Astrocytes play a major role in the control of neuronal proliferation in vitro”, *Brain Research*. 1993; 629(2):199-208.

Schwartz M, Sivron T, **Eitan S**, Hirschberg DL, Lotan M, Elman-Faber A., “Cytokines and cytokine-related substances regulating glial cell response to injury of the central nervous system”, *Progress in Brain Research* .1994; 103:331-41.

Eitan S, Solomon A, Lavie V, Yoles E, Hirschberg DL, Belkin M, Schwartz M, “Recovery of visual response of injured adult rat optic nerves treated with transglutaminase”, *Science*. 1994; 264(5166):1764-8.

Eizenberg O, Kaplitt MG, **Eitan S**, Pfaff DW, Hirschberg DL, Schwartz M, “Linear dimeric interleukin-2 obtained by the use of a defective herpes simplex viral vector: conformation-activity relationship”, *Brain research. Molecular Brain Research*. 1994; 26(1-2):156-62.

PUBLICATIONS (CONT)

Schwartz M, Hirschberg DL, Yoles E, Solomon A, Belkin M, **Eitan S**, Lavie V, FaberElman A, Beserman P, Spiegler O, “Optic nerve disease and injury: Prospects for induction of regeneration”, *Progress in Retinal and Eye Research*, 1996; 15(2): 569-582 .

Monsonogo A, Mizrahi T, Friedmann I, **Eitan S**, Shani Y, Schwartz M, “The blood coagulation factor XIIIa and regeneration of the nervous system”, *Journal of Neurochemistry*; 1997, 69: S117-S117

Monsonogo A, Mizrahi T, **Eitan S**, Moalem G, Bardos H, Adany R, Schwartz M., “Factor XIIIa as a nerve-associated transglutaminase”, *The FASEB Journal*. 1998; 12(12):1163-71.

Li Y, **Eitan S**, Wu J, Evans CJ, Kieffer B, Sun X, Polakiewicz RD., “Morphine induces desensitization of insulin receptor signaling”. *Molecular and Cellular Biology*. 2003; 23(17):6255-66.

Eitan S, Bryant CD, Saliminejad N, Yang YC, Vodjani E, Keith Jr. D, R Polakiewicz R, Evans CJ., “Brain region-specific mechanisms for acute morphine-induced mitogen activated protein kinase modulation and distinct patterns of activation during analgesic tolerance and locomotor sensitization”. *The Journal of Neuroscience*. 2003; 23(23):8360-9.

Lutfy K, **Eitan S**, Yang YC, Walwyn W, Kieffer BL, Takeshima H, Carroll FI, Maidment NT, Evans CJ., “Buprenorphine-induced antinociception is mediated by mu opioid receptors and compromised by concomitant activation of ORL-1 receptors”, *The Journal of Neuroscience*. 2003; 23(32):10331-7.

Bryant CD, **Eitan S**, Sinchak K, Fanselow MS, Evans CJ, “NMDA Receptor Antagonism Disrupts the Development of Morphine Analgesic Tolerance in Male, but not Female C57BL/6J Mice”. *Am J Physiol Regul Integr Comp Physiol*. 2006; 291(2):R315-26.

Hodgson SR, Hofford RS, Norris CJ, **Eitan S**, "Increased elevated plus maze open-arm time in mice during naloxone-precipitated morphine withdrawal", *Behavioural Pharmacology*. 2008, 19(8):805-11.

Hodgson SR, Hofford RS, Wellman PJ, **Eitan S**, "Different affective response to opioid withdrawal in adolescent and adult mice", *Life Sciences*. 2009, 84(1-2):52-60.

Buckman SG, Hodgson SR, Hofford RS, **Eitan S**, “Increased elevated plus maze open-arm time in mice during spontaneous morphine withdrawal”, *Behavioural Brain Research*. 2009, 197:454-456.

Hodgson SR, Hofford RS, Buckman SG, Wellman PJ, **Eitan S**. "Morphine-induced stereotyped thigmotaxis could appear as enhanced fear and anxiety in some behavioral tests", *Journal of Psychopharmacology*. 2010, 24(6):875-80.

Hofford RS, Hodgson SR, Roberts KW, Bryant CD, Evans CJ, **Eitan S**, "Extracellular signal-regulated kinase is involved in mediating changes in elevated plus maze behavior during opioid withdrawal", *Behavioural Pharmacology* 2009, 20(7):576-83

PUBLICATIONS (CONT)

Hodgson SR, Hofford RS, Eitan D, Wellman PJ, **Eitan S**, "Sex-dependent differences in affective response to opioid withdrawal during adolescence", *Journal of Psychopharmacology*. 2010, 24(9):1411-7

Escande-Beillard N, Washburn L, Zekzer D, Wu ZP, **Eitan S**, Ivkovic S, Lu Y, Dang H, Middleton B, Bilousova TV, Yoshimura Y, Evans CJ, Joyce S, Tian J, Kaufman DL. "Neurons Preferentially Respond to Self-MHC Class I Allele Products Regardless of Peptide Presented" *Journal of Immunology* 2010, 184(2):816-23.

Hodgson SR, Hofford RS, Roberts KW, Wellman PJ, **Eitan S**, "Socially-induced morphine pseudo-sensitization in adolescent mice", *Behavioural Pharmacology*. 2010, 21(2):112-20

Hofford RS, Roberts KW, Wellman PJ, **Eitan S**, "Social influences on morphine sensitization in adolescence females", *Drug and Alcohol Dependence* 2010, 110(3):263-6

Hofford RS, Wellman PJ, **Eitan S**, "Social influences on testosterone levels in morphine withdrawn adolescence mice and their drug-naïve cage-mates", *Psychoneuroendocrinology*, 2011, 36(5):728-36

Washburn L, Zekzer D, **Eitan S**, Lu Y, Dang H, Middleton B, Evans CJ, Tian J, Kaufman DL, "A potential role for shed soluble major histocompatibility class I molecules as modulators of neurite outgrowth", *PLoS ONE*, 2011, 6(3):e18439

Wellman PJ, Clifford PS, Rodriguez J, Hughes S, **Eitan S**, Brunel L, Fehrentz JA, Martinez J, "Pharmacologic Antagonism of Ghrelin Receptors Attenuates Nicotine Induced Locomotor Sensitization in Rats" *Regulatory Peptides*, 2011, 172(1-3):77-80.

Hofford RS, Wellman PJ, **Eitan S**, "Morphine alters the locomotor responses of D2/D3 dopamine receptors in adolescent, but not adult, mice" *Journal of Psychopharmacology*, 2012, 26(10):1355-65.

Hofford RS, Schul DL, Wellman PJ, **Eitan S**. "Social influences on morphine sensitization in adolescent rats". *Addiction Biology*, 2012, 17(3):547-56.

Clifford PS, Rodriguez J, Schul D, Hughes S, Kniffin T, Hart N, **Eitan S**, Brunel L, Fehrentz JA, Martinez J, Wellman PJ. "Attenuation of cocaine-induced locomotor sensitization in rats sustaining genetic or pharmacologic antagonism of ghrelin receptors". *Addiction Biology*, 2012, 17(6):956-63.

Cole SL, Hofford RS, Evert DJ, Wellman PJ, **Eitan S**. "Social influences on morphine conditioned place preference in adolescent mice". *Addiction Biology*, 2013, 18(2):274-85.

Barwatt JW, Hofford RS, Emery MA, Bates ML, Wellman PJ, **Eitan S**. "Differential effects of methadone and buprenorphine on the response of D2/D3 dopamine receptors in adolescent mice". *Drug and Alcohol Dependence*, 2013, 132(3):420-6.

PUBLICATIONS (CONT)

Bates ML, Emery MA, Wellman PJ, Eitan S. “Social housing conditions influence morphine dependence and the extinction of morphine place preference in adolescent mice”. *Drug and Alcohol Dependence*, 2014, 142:283-9.

Emery MA, Bates ML, Wellman PJ, Eitan S. “Differential effects of oxycodone, hydrocodone, and morphine on the responses of D2/D3 dopamine receptors”. *Behavioural Brain Research*, 2015, 284:37-41.

Emery MA, Bates ML, Wellman PJ, Eitan S. “Differential Effects of Oxycodone, Hydrocodone, and Morphine on Activation Levels of Signaling Molecules”, *Pain medicine*, 2016, 17: 908-914.

Bates ML, Emery MA, Wellman PJ, Eitan S. “Social environment alters opioid-induced hyperalgesia and antinociceptive tolerance in adolescent mice”. *European journal of pain*, 2016, 20(6):998-1009.

Emery MA, Bates ML, Wellman PJ, Eitan S. “Burn injury decreases the antinociceptive effects of opioids.” *Behavioural Pharmacology*, 2017, 28(4):285-293.

Emery MA, Bates ML, Wellman PJ, Eitan S. "Hydrocodone is more effective than morphine or oxycodone in suppressing the development of burn-induced mechanical allodynia." *Pain Medicine*, 2017, 18(11):2170-2180.

Emery MA, Bates ML, Wellman PJ, Eitan S. "Hydrocodone, but neither morphine nor oxycodone, is effective in suppressing burn-induced mechanical allodynia in the uninjured foot contralateral to the burn" *Journal of Burn Care and Research*, 2017, 38(5):319-326.

Eitan S, Emery MA, Bates MLS, Horrax CT. “Opioid addiction: Who are your real friends?” *Neuroscience & Biobehavioral Reviews*, 2017, 83:697-712.

Bates MLS, Emery MA, Wellman PJ, Eitan S. “Inhibiting social support from massage-like stroking increases morphine dependence.” *Behavioural Pharmacology, Special Issue on “Novel Techniques for the Study of Behavioural Pharmacology”*, 2017, 28(8):642-647.

SUBMITTED & IN PREPARATION:

Bates, MLS, Hoffer RS, Emery MA, Wellman PJ, Eitan S. (revision under review). “The role of the vasopressin system and dopamine D1 receptors in the effects of social housing condition on morphine reward.”

Emery MA, Bates MLS, Wellman PJ, Eitan S (*submitted*). “Early response to opioid treatment in mice predicts the development of burn pain”.

Emery MA, **Eitan S** (*In preparation*). “Different opioids, different outcomes: new approaches for pain management”.

Emery MA, **Eitan S** (*In preparation*). “Burn care: are all opioid equal?”

Horrax CT, Emery MA, Bates MLS, **Eitan S** (*In preparation*). “Morphine-induced gene expression depends on social housing conditions”

CONFERENCE PRESENTATIONS (Since 2005 in Chronological Order):

Copeland S and **Eitan S**, “The connection of signaling pathways to opiate-induced behaviors”, 3rd annual TAMUS Pathways Student Research Symposium, November 4-5, 2005 in Kingsville, TX

Eitan S, “Cellular Signaling via Opioid Receptors: implications for Buprenorphine”, Annual conference of the *American Society of Addiction Medicine (ASAM)*, April 26th, 2007, Miami Beach, Florida.

Eitan S, Hodgson SR, Hofford RS, and Norris CJ, “MAPK mediates an increase in risk-taking or escape behaviors during morphine withdrawal”, Annual meeting of Society of Neuroscience (SfN), Nov 2007, San Diego, CA.

Hofford RS, Hodgson SR, and **Eitan S**, “Receptor subtypes and signaling pathways underlying EPM behaviors in mice during opioid withdrawal”, Annual meeting of Society of Neuroscience (SfN), Nov 2008, Washington, D.C.

Eitan S, Hofford RS, Wellman PJ, Hodgson SR, “Different affective response to opioid withdrawal in adolescent and adult mice”, Annual meeting of Society of Neuroscience (SfN), Nov 2008, Washington, D.C.

Hofford RS, Roberts KW, Wellman PJ, **Eitan S**, “Testosterone level is associated with sex-dependent social effect on morphine sensitization”, Annual meeting of Society of Neuroscience (SfN), Oct 2009, Chicago, IL

Eitan S, Hofford RS, Roberts KW, Wellman PJ, “Socially-induced morphine pseudo-sensitization in adolescent mice”, Annual meeting of Society of Neuroscience (SfN), Oct 2009, Chicago, IL

Hofford RS, Roberts KW, Wellman PJ, **Eitan S**, “Testosterone level is associated with social effect on morphine sensitization”, 14th Annual UT Austin Institute for Neuroscience Symposium, Jan 2010, Austin, TX

Eitan S, Hofford RS, Roberts KW, Wellman PJ, “Socially-induced morphine pseudo-sensitization in adolescent mice”, The College on Problems of Drug Dependence (CPDD) Scientific Meeting, June 2010, Scottsdale, Arizona.

Hofford RS, Wellman PJ, **Eitan S**, “Altered functionality of dopamine receptors in adolescent mice during opioid withdrawal”, Annual meeting of Society of Neuroscience (SfN), Nov 2010, San Diego, CA

CONFERENCE PRESENTATIONS (CONT)

- Cole SL, Hofford RS, Evert DJ, Wellman PJ, Eitan S, “Social influences on morphine conditioned place preference in adolescent mice”, Annual meeting of Society of Neuroscience (SfN), Nov 2011, Washington, D.C.
- Hofford RS, Wellman PJ, Eitan S, “Morphine treatment results in enhanced supersensitivity of the dopamine D2L receptor in morphine-treated adolescents as compared to adults”, Annual meeting of Society of Neuroscience (SfN), Nov 2011, Washington, D.C.
- Cole SL, Hofford RS, Evert DJ, Wellman PJ, Eitan S, “Social influences on morphine conditioned place preference in adolescent mice”, Society of Neuroscience Texas A&M Chapter symposium, Dec 2011, College Station, TX – Undergraduate poster winner
- Hofford RS, Wellman PJ, Eitan S, “Morphine treatment results in enhanced supersensitivity of the dopamine D2L receptor in morphine-treated adolescents as compared to adults”, Society of Neuroscience Texas A&M Chapter symposium, Dec 2011, College Station, TX
- Hofford RS, Cole SL, Bates MLS, Emery MA, Wellman PJ, Eitan S, “The oxytocin and arginine vasopressin systems mediate the social effect on morphine conditioned place preference”, Upcoming annual meeting of Society of Neuroscience (SfN), Oct 2012, New Orleans, LA.
- Barwatt JW, Hofford RS, Emery MA, Bates MLS, Wellman PJ, Eitan S, “Differential effects of methadone and buprenorphine on the response of D2/D3 dopamine receptors in adolescent mice”, Upcoming annual meeting of Society of Neuroscience (SfN), Oct 2012, New Orleans, LA.
- Hofford RS, Cole SL, Bates MLS, Emery MA, Wellman PJ, Eitan S, “The oxytocin and arginine vasopressin systems mediate the social effect on morphine conditioned place preference”, Annual TAMIN Symposium, April 5, 2013.
- Seloff KE, Emery MA, Bates MLS, Eitan S, “Repeated morphine exposure decreases mGluR1 activity in the dorsal striatum of adolescent mice at 2, but not 4 or 24, hours following final administration of morphine”, Annual TAMIN Symposium, April 5, 2013.
- Barwatt JW, Hofford RS, Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Differential effects of methadone and buprenorphine on the response of D2/D3 dopamine receptors in adolescent mice”, Annual TAMIN Symposium, April 5, 2013.
- Bates MLS, Cole SL, Hofford RS, Emery MA, Wellman PJ, Eitan S, “Social housing conditions influence extinction of morphine place preference in adolescent mice”, Annual meeting of Society of Neuroscience (SfN), Nov 2013, San Diego, CA.
- Emery MA, Bates MLS, Wellman PJ, Eitan S, “Differential effects of hydrocodone, oxycodone, and morphine on the response of D2/D3 dopamine receptors in adolescent mice”, Annual meeting of Society of Neuroscience (SfN), Nov 2013, San Diego, CA.

CONFERENCE PRESENTATIONS (CONT)

Seloff KE, Emery MA, Bates MLS, Wellman PJ, Eitan S, “The effects of repeated morphine exposure on metabotropic glutamate receptor activity in adolescent mice”, Annual meeting of Society of Neuroscience (SfN), Nov 2013, San Diego, CA.

Bates MLS, Cole SL, Hofford RS, Emery MA, Wellman PJ, Eitan S, “Social housing conditions influence extinction of morphine place preference in adolescent mice”, Neuroscience Texas A&M Chapter symposium, Jan 2014, College Station, TX.

Emery MA, Bates MLS, Wellman PJ, Eitan S, “Differential effects of oxycodone, hydrocodone, and morphine on the response of D2/D3 dopamine receptors in adolescent mice”, Annual TAMIN Symposium, April 11, 2014

Bates MLS, Emery MA, Wellman PJ, Eitan S, “Social housing conditions influence the analgesic properties of opioids in adolescent mice”, Annual meeting of Society of Neuroscience (SfN), Oct 2014, Washington DC.

Emery MA, Bates MLS, Wellman PJ, Eitan S, “Differential effects of various opioids on the development of allodynia and abuse in the context of pain”, Annual meeting of Society of Neuroscience (SfN), Oct 2014, Washington DC.

Bates MLS, Emery MA, Wellman PJ, Eitan S, “Social housing conditions influence the analgesic properties of opioids in adolescent mice”, Neuroscience Texas A&M Chapter symposium, Dec 2014, College Station, TX. - *Senior graduate student first place poster winner*

Emery MA, Bates MLS, Wellman PJ, Eitan S, “Differential effects of various opioids on the development of allodynia and abuse in the context of pain”, Neuroscience Texas A&M Chapter symposium, Dec 2014, College Station, TX.

Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Differential effects of various opioids on the development of allodynia and abuse in the context of pain”, Texas A&M Student Research Week, March 25, 2015.

Bates, MLS, Emery, MA, Wellman, PJ, and Eitan S, “Social housing conditions influence the analgesic properties of opioids in adolescent mice”, Texas A&M Student Research Week, March 2015.

Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Differential effects of various opioids on the development of allodynia and abuse in the context of pain”, Annual TAMIN Symposium, March 27, 2015.

Bates MLS, Emery MA, Wellman PJ, and Eitan S, “Social housing conditions influence the analgesic properties of opioid in adolescent mice”, Annual TAMIN Symposium, March 27, 2015.

Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Differential locomotor responses to quinpirole following various opioids is driven by the mu receptor”, Annual meeting of Society of Neuroscience (SfN), Oct 2015, Chicago.

CONFERENCE PRESENTATIONS (CONT)

Bates MLS, Emery MA, Wellman PJ, and Eitan S, “Contribution of MRGPRB4-expressing sensory neurons to the socio-environmental effect on opioid dependence and reward in adolescent mice”, Annual meeting of Society of Neuroscience (SfN), Oct 2015, Chicago.

Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Differential locomotor responses to quinpirole following various opioids is driven by the mu receptor”, Neuroscience Texas A&M Chapter symposium, Dec 2015, College Station, TX.

Bates MLS, Emery MA, Wellman PJ, and Eitan S, “Contribution of MRGPRB4-expressing sensory neurons to the socio-environmental effect on opioid dependence and reward in adolescent mice”, Neuroscience Texas A&M Chapter symposium, Dec 2015, College Station, TX.

Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Differential locomotor responses to quinpirole following various opioids is driven by the mu receptor”. Poster presented at Texas A&M University Student Research Week, March 2016.

Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Differential locomotor responses to quinpirole following various opioids is driven by the mu receptor”. Poster presented at Texas A&M University TAMIN Spring Symposium, April 2016.

Emery MA, Bates MLS, Horrax CT, Wellman PJ, and Eitan S, “Hydrocodone is More Effective Than Morphine or Oxycodone in Suppressing Burn-induced Hyperalgesia”, Annual meeting of Society of Neuroscience (SfN), Nov 2016, San Diego.

Bates MLS, Emery MA, Wellman PJ, and Eitan S, “The influence of social housing conditions on morphine-induced gene expression”, Annual meeting of Society of Neuroscience (SfN), Nov 2016, San Diego.

Horrax CT, Emery MA, Bates MLS, Wellman PJ, and Eitan S, “Oxycodone, hydrocodone, and morphine differentially affect gene expression”, Annual meeting of Society of Neuroscience (SfN), Nov 2016, San Diego.

Horrax, CT, Emery MA, Bates MLS, Wellman PJ, and Eitan S. “Oxycodone, hydrocodone, and morphine differentially affect gene expression”. Poster presented at the Annual Behavior, Biology, and Chemistry: Translational Research in Addiction conference, March 2017, San Antonio, TX.

Bates MLS, Emery MA, Wellman PJ, and Eitan S. “The influence of social housing conditions on morphine-induced gene expression”. Poster presented at the Annual Behavior, Biology, and Chemistry: Translational Research in Addiction conference, March 2017, San Antonio, TX.

Emery MA, Bates MLS, Horrax, CT, Wellman PJ, and Eitan S. “Hydrocodone is more effective than morphine or oxycodone in suppressing burn-induced hyperalgesia”. Poster presented at the Annual Behavior, Biology, and Chemistry: Translational Research in Addiction conference, March 2017, San Antonio, TX.

TEACHING INTEREST

PSYC 333 - Biology of Psychological Disorders
 PSYC 335 Honor - Physiological Psychology
 PSYC 335 - Physiological Psychology (undergraduates)
 PSYC 649 - Seminars in Behavioral Neuroscience
 PSYC 609 - Physiological Psychology (graduate)

STUDENTS MENTORED

Graduate (PhD) Students:

2005 Shannon Copeland, Behavioral Psychology
 2006-2012 Rebecca S Hofford, Behavioral Psychology
 Prestigious post-doc with Dr. Michael Bardo, Center for Drug Abuse Research Translation, University of Kentucky.
 2009 Amy Sireci, Behavioral Psychology
 2011-2017 Melvin L. Shawn Bates, Interdisciplinary Neuroscience Program
 Post-doc with Dr. Bhatnagar, Children's Hospital of Philadelphia and the University of Pennsylvania.
 2011-present Michael A Emery, Interdisciplinary Neuroscience Program
 (To be) Prestigious post-doc with Dr. Huda Akil, Molecular & Behavioral Neuroscience Institute, University of Michigan.
 2015-present Christopher T Horrax, Interdisciplinary Neuroscience Program

Undergraduate Research Assistants:

2006	Avery Wright	2009	George Gold
2006	Justin Sokol	2009-10	Josh Patterson
2006	Makayla Puente	2010-11	Pamela Beltran
2006-07	Chris Norris	2010-11	Nathan Zuck
2007	Emily Garrett	2010	Daniel Evert
2007	David Morris	2010	Danielle Creamer
2007	Danielle Brown	2010	Prakhar Jain
2007-08	Sara Botts	2010	Benjamin Shlomo
2007-08	Juliana McElroy	2011	Shannon Zelikoff
2007-08	Sara Yuglich	2011-12	Shannon Cole
2008-09	Alexandria Uribe	2011-12	Kelsey Smith
2008	Sam Buckman	2011	Collette Bice
2008-09	Michael Hansen	2011-12	Suqrat Munawar
2008	Mandy Morstad	2011-13	Joseph William Barwatt
2008	Caroline Nguyen	2011-13	Katelyn Seloff
2008	Meagan Thomas	2011-12	Kimberly Ann Pate
2008	Hailey Womack	2011-12	Randall Lopez
2008-09	Renee Lee	2012	Abigail Jean Rutledge
2009-10	David Chastain	2012-13	Sergio Estrada
2009	Christina Kuchenbecker	2012-13	Victoria Elizabeth Lehrmann

2012-13	Grayson Clark Miller	2015-16	Ashley Noel Daniel
2013	Cristina Annalee Enders	2015	Meagan Jean Davis
2013	Daniela Servin	2015-16	Jeremiah James Froese
2013	Christopher John Grabinski	2015	Kaitlyn Evette Covert
2013-14	Kimberlyn Allison Jagers	2015	Ismael Santamaria
2013-14	Serene Selli	2015	Nicole Neeka Kash
2013	Hannah M Toarmina	2015-16	Jocelyn Morales
2013-14	Jill Danielle Allen	2016-17	Emily Catherine Pali
2013	Cristina Annalee Enders	2016	Dominick Noel Fuentes
2013-14	James Ray Goen	2016	Phillip Vincent Martinez
2013	Anusha Ponnuru	2016	Erin Elizabeth Davis
2014-15	Samuel Robert Taylor	2016	Ty Michael Gadberry
2014	Jacob Ryan Pavel	2016-present	Sydney Jane Sanders
2014-15	Antonio Santos Rojas	2017-present	Inaas Laila Shirazi
2014-15	Courtney Michelle Markley	2017-present	Kelyn M'Kinley Wardlaw
2014-15	Marissa Milan Salazar	2018-present	Rebecca Nicole Gates
2014-15	Lauren Elizabeth Dale	2018-present	Yasmin Isabel Flores
2014-15	Patrick Michael Connell	2018-present	Maisa Nida Shirazi
2014-16	Sarah Eileen Taylor		