

STEPHEN MAREN, PhD

Professor, Department of Psychology
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RESEARCH INTERESTS

My research focuses on the neural mechanisms underlying emotional learning and memory in animals and the relevance of these mechanisms to clinical disorders of fear and anxiety, including post-traumatic stress disorder.

EDUCATION

1993 **PhD**, Biological Sciences (Neurobiology), University of Southern California
1991 **MS**, Biological Sciences (Neurobiology), University of Southern California
1989 **BS**, Psychology (*cum laude* with Honors), University of Illinois at Urbana-Champaign

EMPLOYMENT HISTORY

2024-pres **Professor**, Department of Psychology, University of Illinois at Urbana-Champaign
2012-2024 **University Distinguished Professor**, Charles H. Gregory Chair, Department of Psychological and Brain Sciences, Department of Biology, and Institute for Neuroscience, Texas A&M University
2006-2012 **Professor**, Department of Psychology and Neuroscience Program, University of Michigan
2002-2006 **Associate Professor**, Department of Psychology and Neuroscience Program, University of Michigan
1996-2002 **Assistant Professor**, Department of Psychology and Neuroscience Program, University of Michigan
1993-1996 **Postdoctoral Fellow**, Department of Psychology, University of California, Los Angeles

ADMINISTRATIVE APPOINTMENTS

2024-pres **Director**, Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign
2023-2024 **Dean's Research Fellow**, Office of the Dean, College of Arts & Sciences, Texas A&M University
2023-pres **Elected Member**, Executive Committee of the Distinguished Professors, Texas A&M University
2022-pres **External Adviser**, "Training in Learning and Memory" (5T32MH106454-07), University of Texas
2019-2022 **Chair-Elect, Chair, and Past-Chair, Council of Principal Investigators**, Vice President for Research, Texas A&M University
2012-2020 **Area Coordinator** (Behavioral & Cellular Neuroscience), Department of Psychological and Brain Sciences, Texas A&M University
2007-2012 **Director**, Neuroscience Graduate Program, University of Michigan
2004-2007 **Associate Director**, Neuroscience Graduate Program, University of Michigan

HONORS AND AWARDS

2024 **Fellow**, American Association for the Advancement of Science (Neuroscience)
2023 **Regents Professor**, Texas A&M University System

- 2023 **Nico Frijda Chair in Brain and Cognitive Science**, University of Amsterdam
- 2023 **Distinguished Achievement Award for Research (University-Level)**, Association of Former Students, Texas A&M University [*highest faculty research award made by TAMU*]
- 2021 **Fellow**, Center for the Neurobiology of Learning and Memory, University of California, Irvine
- 2019 **W. Horsley Gantt Medal**, Pavlovian Society
- 2019 **Member**, American College of Neuropsychopharmacology
- 2019 **Charles H. Gregory Chair of Liberal Arts**, Texas A&M University
- 2018 **University Distinguished Professor**, Texas A&M University
- 2018 **Distinguished Investigator Award**, Brain & Behavior Research Foundation
- 2017 **Member**, Scientific Council, Brain & Behavior Research Foundation
- 2017 **Presidential Impact Fellow** (lifetime title), Awarded by President Michael K. Young, Texas A&M University
- 2017 **D.O. Hebb Distinguished Scientific Contributions Award**, American Psychological Association
- 2015 **Claude H. Everett, Jr. '47 Chair of Liberal Arts**, Texas A&M University
- 2015 **Memory and Cognitive Disorders Award**, McKnight Endowment for Neuroscience, McKnight Foundation
- 2013 **President**, Pavlovian Society
- 2009 **Fellow**, Association for Psychological Science
- 2005 **Faculty Recognition Award**, Horace H. Rackham School of Graduate Studies, University of Michigan
- 2004 **Fellow**, American Psychological Association
- 2001 **Distinguished Scientific Award for Early Career Contribution to Psychology** (Behavioral and Cognitive Neuroscience), American Psychological Association
- 2001 **LS&A Excellence in Education Award**, College of Literature, Science & Arts, University of Michigan
- 1990 **Honorable Mention**, Graduate Research Fellowship Program, National Science Foundation
- 1989 **Dean's Fellowship**, University of Southern California
- 1989 **Inductee**, Phi Beta Kappa Honor Society
- 1988 **Invited Participant**, University of California-Irvine Summer Institute in Neuroscience
- 1987 **Edmund J. James Scholarship**, University of Illinois

EDITORIAL POSITIONS

- 2003-pres **Editorial Board**, *Neuroscience & Biobehavioral Reviews* (2003-pres), *Learning & Memory* (2017-pres), *Hippocampus* (2018-pres)
- 2010-21 **Editor-in-Chief**, *Behavioural Brain Research*

GRANTS

[CONTINUOUSLY FUNDED BY NIH SINCE 1995; >\$20M IN TOTAL]

Active:

- 2024-2029 **Neural Circuits for Stress-Impaired Extinction Learning** (R01MH117852-07), *National Institute of Mental Health*, \$3,618,896. Role: PI. 8/16/24-7/30/29
- 2023-2028 **Striatal Ensemble Plasticity and Alcohol Use Disorder** (AA030293-01A1), *National Institute on Alcohol Abuse and Addiction* \$2,787,732. Role: co-I; PI: J. Wang). 7/1/23-6/30/28.
- 2021-2026 **Neural Substrates of Contextual Memory in Fear Extinction** (R01MH065961-20A1), *National Institute of Mental Health*, \$2,787,732. Role: PI. 7/1/21-6/30/26
- 2023-2026 **Exploring Striatal Circuits Underlying Behavioral Flexibility During Punishment of Cocaine Seeking**. [Diversity Specialized Predoctoral to Postdoctoral Advancement in Neuroscience (D-SPAN) Award; F99/K00]. *National Institutes of Health*, \$83,868. Role: Co-Sponsor (Awardee: Adelis Cruz). 9/15/2022 - 8/31/2025.

- 2021-2025 **Dissecting Connectivity and Function of Transplanted Interneurons in the Injured Spinal Cord** (R01NS116404-01A1), *National Institute of Neurological Disorders and Stroke*, \$1,872,495. Role: Unpaid consultant. 01/01/21 - 11/30/25.
- Completed:**
- 2022-2024 **Covert Capture and Erasure of Fear Memory**, *WoodNext Foundation (gift)*, \$2,000,000 (terminated with change of institution). Role: PI. 1/1/2023-8/31/2024.
- 2022-2023 **Physiological Impact and Neural Basis of Macronutrient Preference Rhythm**. *Texas A&M University, Nutrition and Obesity Research Center (tNORC)*, \$25,000. Role: co-PI (Lead: Jerome Menet, Dept. of Biology, TAMU). 1/1/22-12/30/23
- 2022-2023 **When is the Best Time of Exercise for Psychiatric Well-being?** *Seed Grant Program for Promoting Research Collaborations (former Colleges of Liberal Arts, Science, and Geosciences) Type I Project, Texas A&M University*, \$10,000. Role: Co-PI (Lead PI: Shogo Sato, Biology, Co-PI: Naomi Nagaya, PBSI). 6/1/22-5/31/23
- 2020-2022 **Research Supplements to Promote Diversity in Health-Related Research**. (R01MH117852-03S1). Parent R01: *Neural Circuits for Stress-Impaired Extinction Learning. National Institute of Mental Health*, \$85,142. Role: PI (Awardee: Annalise Binette, TAMIN). 9/1/20-8/30/22
- 2019-2022 **Engineering Brain Health Using an Adaptive Wireless Optogenetic Neurostimulator**. *Texas A&M University X-Grant, Presidential Excellence Fund*, \$1,500,000. Role: Lead (co-Is: William Griffiths, TAMUHSC; Sung-Il Park, CoEngin). 9/1/19-8/30/23
- 2015-2020 **Neural Substrates of Contextual Memory in Fear Extinction** (R01MH065961-12A1), *National Institute of Mental Health*, \$1,803,535. Role: PI. 2/1/15-1/31/21 (Competitive renewal submitted)
- 2018-2019 **Covert Capture and Erasure of Fear Memory**. *2017 NARSAD Distinguished Investigator Grant, Brain & Behavior Research Foundation*. \$100,000. Role: PI. 3/15/18-3/14/20.
- 2015-2019 **Prefrontal-Hippocampal Interplay in Contextual Memory Retrieval**. *McKnight Memory and Cognitive Disorders Program, McKnight Foundation*, \$300,000. 2/1/15-1/31/20.
- 2017-2019 **Noradrenergic Modulation of Stress-Induced Deficits in Fear Extinction**. (F31MH112208-01), *National Institute of Mental Health*, \$73,307. Role: Sponsor (PI: Thomas F. Giustino, TAMIN). 9/1/17-8/31/19
- 2016-2019 **Brain-Behavior Markers of Negative Affectivity, Comorbidity in Anxiety Disorders**. (K23MH105553-01A1). *National Institutes of Mental Health*, \$528,324. Role: Co-Investigator, Primary Mentor (PI: Annmarie MacNamara). 8/1/16-8/31/19
- 2016-2018 **Neural Circuits for Stress-Induced Fear Relapse**. (F31MH107113-01A1), *National Institute of Mental Health*, \$64,185. Role: Sponsor (PI: Travis D. Goode, TAMIN) 8/1/16-7/31/18
- 2008-2014 **Neural Substrates of Contextual Memory in Fear Extinction** (R01MH065961-06A1), *National Institute of Mental Health*, \$1,868,995. Role: PI
- 2010-2012 **Interactions Between the Ventral Hippocampus and Amygdala During Renewal of Fear** (F31MH019822-02), *National Institute of Mental Health*, \$64,185. Role: Sponsor (PI: Caitlin A. Orsini, Department of Psychology, University of Michigan)
- 2001-2016 **Early Stage Training in Neuroscience** (T32EY017878-07), *National Eye Institute (and 6 others)*, \$1,491,060 Role: PI (ongoing at University of Michigan).
- 2006-2010 **Amygdaloid Function in Fear Conditioning** (R01MH073655-05), *National Institute of Mental Health*, \$760,963. Role: PI
- 2002-2008 **Neural Substrates of Contextual Memory** (R01MH065961-1A1), *National Institute of Mental Health*, \$1,532,450. Role: PI
- 2005-2008 **Cholinergic Plasticity in Auditory Input Processing** (R03MH73600), *National Institute of Mental Health*, \$152,708. Role: Co-I (Martin Sarter, PI)

- 1998-2003 **Amygdaloid Function in Fear Conditioning** (R29MH57865), *First Independent Research Support and Transition Award, National Institute of Mental Health, \$452,000*. Role: PI
- 2000-2003 **Learning and Memory in a Transgenic Mouse Model of Alzheimer's Disease**, *Michigan Alzheimer's Disease Research Center Pilot Grant, National Institute of Aging, \$20,000*. Role: PI
- 1999-1999 **Summer Research Grant**, *Rackham Graduate School, University of Michigan, \$3,000*. Role: PI
- 1997-1998 **Neural Basis of Contextual Fear Conditioning** (R03MH57260), *Behavioral Science Track Award for Rapid Transition, National Institute of Mental Health, \$35,824*. Role: PI
- 1997-2001 **Brain Mechanisms of Contextual Fear Conditioning**, *Preliminary Project Grant, Office of the Vice President for Research, University of Michigan, \$12,000*. Role: PI
- 1995-1996 **Synaptic Mechanisms of Pavlovian Fear Conditioning** (F32MH11061), *Individual National Research Service Award, National Institute of Mental Health, Department of Psychology, University of California*. Role: PI
- 1993-1995 **Training in Physiological Psychology** (F32MH15795), *Institutional National Research Service Award, National Institute of Mental Health, Department of Psychology, University of California*. Role: Trainee

SUBMITTED PUBLICATIONS AND PREPRINTS

- (1) Kim, W. S., Liu, J., Li, Q., Hong, S., Qi, K., Cherukuri, R., Yoon, B.-J., Moscarello, J., Choe, Y., **Maren, S.**, Park, S.-I. (2021). AI-driven high-throughput automation of behavioral analysis and dual-channel wireless optogenetics for multiplexing brain dynamics. *bioRxiv*, doi: 10.1101/2021.09.23.461279.

PUBLICATIONS (180 IN TOTAL)

[GOOGLE SCHOLAR: H = 91, CITES = 31,460; ISI HIGHLY CITED SCIENTIST (TOP 1%) IN NEUROSCIENCE & BEHAVIOR]

- (1) Vasudevan, K., Hassell, J. E., Jr., **Maren, S.** (2024). Hippocampal engrams and contextual memory. In Gräff, J. and Ramirez, S. (Eds). *Engrams*. Springer-Nature.
- (2) Oleksiak, C. R., Plas, S. L., Carriaga, D., Vadudevan, K., **Maren, S.**, Moscarello, J. M. (2024). Ventral hippocampus mediates inter-trial responding in signaled active avoidance. *Behavioural Brain Research*.
- (3) **Maren, S.** (2024). Learning or performance? Why the distinction matters for memory science. *The Transmitter*, doi: 10.53053/TAME9525.
- (4) Plas, S. L., Tuna, T., Bayer, H., Juliano, V. A. L., Sweck, S. O., Perez, A. D., Hassell, J. E., Jr., **Maren, S.** (2024). Neural circuits for the adaptive regulation of fear and extinction memory. *Frontiers in Behavioral Neuroscience*, doi: 10.3389/fnbeh.2024.1352797.
- (5) **Maren, S.** (2023). It takes a village: Neurons partner with vascular pericytes to make memory. *Neuron*, 111(23):3701-02. doi: 10.1016/j.neuron.2023.10.036.
- (6) Totty, M. S., Tuna, T., Ramanathan, K. R., Jin, J., Peters, S. E., **Maren, S.** (2023). Thalamic nucleus reuniens coordinates prefrontal-hippocampal synchrony to suppress extinguished fear. *Nature Communications*, 14(1):6565. doi: 10.1038/s41467-023-42315-1.
- (7) Binette, A. N., Liu, J., Bayer, H., Crayton, K. L., Melissari, L., Sweck, S. O., **Maren, S.** (2023). Parvalbumin-positive interneurons in the medial prefrontal cortex regulate stress-induced fear extinction impairments in male and female rats. *Journal of Neuroscience*, 43(22):4162-73. doi.org/10.1523/JNEUROSCI.1442-22.2023.
- (8) Crimmins, B. E., Lingawi, N. W., Chieng, B. C., Leung, B. K., **Maren, S.**, Laurent, V. (2022). Basal forebrain cholinergic signaling in the basolateral amygdala promotes strength and durability of fear memories. *Neuropsychopharmacology*, doi: 10.1038/s41386-022-01427-w.
- (9) Vasudevan, K., Ramanathan, K. R., Vierkant, V., and **Maren, S.** (2022). Nucleus reuniens inactivation does not impair consolidation or reconsolidation of fear extinction. *Learning & Memory*, 29(8):216-222. doi: 10.1101/lm.053611.122.

- (10) Totty, M. S. and **Maren, S.** (2022). Neural oscillations in aversively motivated behavior. *Frontiers in Behavioral Neuroscience*, 16:936036. doi: 10.3389/fnbeh.2022.936036.
- (11) Binette, A. N., Totty, M. S., and **Maren, S.** (2022). Sex differences in the immediate extinction deficit and renewal of fear in rats. *PLoS One*, 17(6):e0264797. doi: 10.1371/journal.pone.0264797.
- (12) **Maren, S.** (2022). Unrelenting fear under stress: Neural circuits and mechanisms for the immediate extinction deficit. *Frontiers in Systems Neuroscience*, 16:888461. doi: 10.3389/fnsys.2022.888461.
- (13) Blair R. S., Acca, G. M., Tsao, B., Stevens, N., **Maren, S.**, Nagaya, N. (2022). Estrous cycle contributes to state-dependent contextual fear in female rats. *Psychoneuroendocrinology*, 141:105776. doi: 10.1016/j.psyneuen.2022.105776.
- (14) Liu, J., Totty, M. S., Melissari, L., and **Maren, S.** (2022). Convergent coding of recent and remote fear memories in the basolateral amygdala. *Biological Psychiatry*, 91(9):832-840. doi: 10.1016/j.biopsych.2021.12.018
- (15) Oleksiak, C. R., Ramanathan, K. R., Miles, O. W., Perry, S. J., **Maren, S.**, and Moscarello, J. M. (2021). Ventral hippocampus mediates the context-dependence of two-way signaled avoidance in rats. *Neurobiology of Learning and Memory*, 183:107458. doi: 10.1016/j.nlm.2021.107458.
- (16) Totty, M. S., Warren, N., Huddleston, I., Ramanathan, K. R., Ressler, R. L., Oleksiak, C. R., and **Maren, S.** (2021). Behavioral and brain mechanisms mediating conditioned flight behavior in rats. *Scientific Reports*, 11:8215. doi: 10.1038/s41598-021-87559-3.
- (17) Ressler, R. L., Goode, T. D., Kim, S., Ramanathan, K. R., and **Maren, S.** (2021). Covert capture and attenuation of a hippocampus-dependent fear memory. *Nature Neuroscience*, 24:677-684. doi: 10.1038/s41593-021-00825-5.
- (18) Bouton, M. E., **Maren, S.**, and McNally, G. P. (2021). Behavioral and neurobiological mechanisms of Pavlovian and instrumental extinction learning. *Physiological Reviews*, 101:611-681. doi: 10.1152/physrev.00016.2020.
- (19) Ressler, R. L., Goode, T. D., Evemy, C., and **Maren, S.** (2020). NMDA receptors in the CeA and BNST differentially regulate fear conditioning to predictable and unpredictable threats. *Neurobiology of Learning and Memory*, 174:107281. doi: 10.1016/j.nlm.2020.107281.
- (20) Giustino, T. F., Ramanathan, K. R., Totty, M. S., Miles, O. W., **Maren, S.** (2020). Locus coeruleus norepinephrine drives stress-induced increases in basolateral amygdala firing and impairs extinction learning. *Journal of Neuroscience*, 40:907-916. doi: 10.1523/JNEUROSCI.1092-19.2019.
- (21) Goode, T. D., Acca, G. M., and **Maren, S.** (2020). Threat imminence dictates the role of the bed nucleus of the stria terminalis in contextual fear. *Neurobiology of Learning and Memory*, 167:107116. doi: 10.1016/j.nlm.2019.107116.
- (22) Haaker, J., **Maren, S.**, Andreatta, M., Merz, C. J., Richter, J., Richter, H. S., Drexler, S. M., Lange, M., Jüngling, K., Nees, F., Seidenbecher, T., Fullana, M. A., Wotjak, C. and Lonsdorf, T. B. (2019). Making translation work: Harmonizing cross-species methodology in the behavioural neuroscience of Pavlovian fear conditioning. *Neuroscience & Biobehavioral Reviews*, 107:329-345. doi: 10.1016/j.neubiorev.2019.09.020.
- (23) Ramanathan, K. R. and **Maren, S.** (2019). Nucleus reuniens mediates the extinction of contextual fear conditioning. *Behavioural Brain Research*, 374:112114. doi: 10.1016/j.bbr.2019.112114
- (24) Totty, M. S., Payne, M. R., **Maren, S.** (2019). Event boundaries do not cause the immediate extinction deficit after Pavlovian fear conditioning in rats. *Scientific Reports*, 9:9459. doi: 10.1038/s41598-019-46010-4.
- (25) Miles, O. W. and **Maren, S.** (2019). Role of the bed nucleus of the stria terminalis in PTSD: Insights from preclinical models. *Frontiers in Behavioral Neuroscience*, 13:68. doi: 10.3389/fnbeh.2019.00068.
- (26) Giustino, T. F., Fitzgerald, P. J., and **Maren, S.** (2019). Locus coeruleus toggles reciprocal prefrontal firing to drive fear relapse. *Proceedings of the National Academy of Sciences*, 116(17):8570-8575. doi: 10.1073/pnas.1814278116.
- (27) Goode, T. D., Ressler, R. L., Acca, G. M., Miles, O. W., and **Maren, S.** (2019). Bed nucleus of the stria terminalis regulates fear to unpredictable threat signals. *eLife*, 8. pii: e46525. doi: 10.7554/eLife.46525.

- (28) Ressler, R. L. and **Maren, S.** (2019). Synaptic encoding of fear memories in the amygdala. *Current Opinion in Neurobiology*, 54:54-59. doi: 10.1016/j.conb.2018.08.012.
- (29) Ramanathan, K. R., Jin, J., Giustino, T. F., Payne, M. R., and **Maren, S.** (2018). Prefrontal projections to the thalamic nucleus reuniens mediate fear extinction. *Nature Communications*, 9:4527. doi: 10.1038/s41467-018-06970-z
- (30) Goode, T. D. and **Maren, S.** (2018). Common neurocircuitry mediating drug and fear relapse in preclinical models. *Psychopharmacology (Berl)*, doi: 10.1007/s00213-018-5024-3.
- (31) Ramanathan, K. R., Ressler, R. L., Jin, J., and **Maren, S.** (2018). Nucleus reuniens mediates the encoding and retrieval of precise, hippocampal-dependent contextual fear memories. *Journal of Neuroscience*, 38:9925-9933. doi: 10.1523/JNEUROSCI.1429-18.2018.
- (32) Goode, T. D., Jin, J., and **Maren, S.** (2018). Neural circuits for fear relapse. In: S. Sangha & D. Foti (Eds.), *Neurobiology of Abnormal Emotion and Motivated Behaviors*. Elsevier.
- (33) Giustino, T. F. and **Maren, S.** (2018), Noradrenergic modulation of fear conditioning and extinction. *Frontiers in Behavioral Neuroscience*, 12:1-12.
- (34) Marek, R., Jin, J., Goode, T. D., Giustino, T. J., Wang, Q., Acca, G. M., Holehonnur, R., Ploski, J. E., Fitzgerald, P. J., Lynagh, T. P., Lynch, J. W., **Maren, S.** & Sah, P.(2018). Hippocampus-driven feed-forward inhibition of the prefrontal cortex mediates fear relapse. *Nature Neuroscience*, 21:384-392.
- (35) Moscarello, J. M. and **Maren, S.** (2018). Flexibility in the face of fear: Hippocampal-prefrontal regulation of fear and avoidance. *Current Opinion in Behavioral Sciences*, 19:44-49.
- (36) Giustino, T. F. and **Maren, S.** (2017). Chandelier cells illuminate inhibitory control of prefrontal-amygdala output. *Trends in Neurosciences*, 40:640-642.
- (37) **Maren, S.** (2017). Synapse-specific encoding of fear memory in the amygdala. *Neuron*, 95:988-990.
- (38) Giustino, T. F., Seeman, J. R., Acca, G. M., Goode, T. D., Fitzgerald, P. J., and **Maren, S.** (2017). β -adrenoceptor blockade in the basolateral amygdala but not the medial prefrontal cortex rescues the immediate extinction deficit in rats. *Neuropsychopharmacology*, 42:2537-2544.
- (39) Goode, T. D. and **Maren, S.** (2017). The role of the bed nucleus of the stria terminalis in aversive learning and memory. *Learning & Memory*, 24:480-91.
- (40) Goode, T. D., Holloway-Erickson, C. M., and **Maren, S.** (2017). Extinction after fear memory reactivation fails to eliminate renewal in rats. *Neurobiology of Learning and Memory*, 142:41-47.
- (41) **Maren, S.** (2017). Emotional learning: animals. In H. Eichenbaum (Ed.), *Memory Systems*. Vol. [3] of *Learning and Memory: A Comprehensive Reference*, 2nd Ed., 4 vols. (J. H. Byrne Editor), pp. [391-410] Oxford: Elsevier.
- (42) Prater, K. E., Aurbach, E. L., Larcinese, H. K., Turner, C. A., Blandino, P., Jr., Watson, S. J., **Maren, S.**, Akil, H. (2017). Selectively bred rats provide a unique model of vulnerability to PTSD-like behavior and respond differentially to FGF2 augmentation early in life. *Neuropsychopharmacology*, 42:1706-14.
- (43) Acca, G. M., Mathew, A. S., Jin, J., **Maren, S.**, Nagaya, N. (2017). Allopregnanolone induces state-dependent fear via the bed nucleus of the stria terminalis. *Hormones and Behavior*, 89:137-44.
- (44) Giustino, T. F., Fitzgerald, P. J., and **Maren, S.** (2016). Fear expression suppresses medial prefrontal cortical firing in rats. *PLoS ONE*, 11:e0165256.
- (45) **Maren, S.** (2016). Neural circuits for context processing in aversive learning and memory. In I. Liberzon & K. Ressler (Eds.), *Neurobiology of PTSD: From Brain to Mind*. Oxford University Press, New York, NY.
- (46) Wang, Q., Jin, J., and **Maren, S.** (2016). Renewal of extinguished fear activates ventral hippocampal neurons projecting to the prelimbic and infralimbic cortices in rats. *Neurobiology of Learning and Memory*, 134:38-43.
- (47) **Maren, S.** (2016). Parsing reward and aversion in the amygdala. *Neuron*, 90:209-211.
- (48) Goode, T. D., Leong, K. C., Goodman, J., **Maren, S.**, and Packard, M. G. (2016). Enhancement of striatum-dependent memory by conditioned fear is mediated by beta-adrenergic receptors in the basolateral amygdala. *Neurobiology of Stress*, 3:74-82.
- (49) Giustino, T. J., Fitzgerald, P. J., and **Maren, S.** (2016). Revisiting propranolol and PTSD: Memory erasure or extinction enhancement? *Neurobiology of Learning and Memory*, 130:26-33.
- (50) **Maren, S.** and Holmes, A. (2016). Stress and fear extinction. *Neuropsychopharmacology*, 4:58-79.

- (51) Jin, J. and **Maren, S.** (2015). Prefrontal-hippocampal interactions in memory and emotion. *Frontiers in Systems Neuroscience*, 9:170.
- (52) Nagaya, N. and **Maren, S.** (2015). Sex, steroids, and fear. *Biological Psychiatry*, 78:152-3.
- (53) **Maren, S.** (2015). Facing our fears. [Review of the book *Anxious: Using the Brain to Understand and Treat Fear and Anxiety*, by J. LeDoux]. *Science*, 349:39.
- (54) Giustino, T. F. and **Maren, S.** (2015). The role of the medial prefrontal cortex in the conditioning and extinction of fear. *Frontiers in Behavioral Neuroscience*, 9:298.
- (55) **Maren, S.** (2015). Out with the old and in with the new: Synaptic mechanisms of extinction in the amygdala. *Brain Research*, 1621:231-238.
- (56) Nagaya, N., Acca, G. M., **Maren, S.** (2015). Allopregnanolone in the bed nucleus of the stria terminalis modulates contextual fear in rats. *Frontiers in Behavioral Neuroscience*, 9:205.
- (57) Goode, T. D., Kim, J. J., and **Maren, S.** (2015). Reversible inactivation of the bed nucleus of the stria terminalis prevents the reinstatement but not renewal of extinguished fear. *eNeuro*, 2(3) e0037-15.2015 1–12.
- (58) Fitzgerald, P. J., Giustino, T. F., Seemann, J. R., **Maren, S.** (2015). Noradrenergic blockade stabilizes prefrontal activity and enables fear extinction under stress. *Proceedings of the National Academy of Science USA*, 112:E3729–E3737.
- (59) Jin, J. and **Maren, S.** (2015). Fear renewal preferentially activates ventral hippocampal neurons projecting to both amygdala and prefrontal cortex in rats. *Scientific Reports*, 5:8388.
- (60) Goode, T. D., Kim, J. J., and **Maren, S.** (2015). Relapse of extinguished fear after exposure to a dangerous context is mitigated by testing in a safe context. *Learning & Memory*, 22:170-178.
- (61) Morrow, J., D., Saunders, B. T., **Maren, S.**, and Robinson, T. E. (2015). Sign-tracking to an appetitive cue predicts incubation of conditioned fear in rats. *Behavioural Brain Research*, 276:59-66.
- (62) Goode, T. D. and **Maren, S.** (2014). Animal models of fear relapse. *ILAR Journal*, 55:246-58.
- (63) **Maren, S.** (2014). Nature and causes of the immediate extinction deficit: a brief review. *Neurobiology of Learning and Memory*, 113:19-24.
- (64) **Maren, S.** (2014). Fear of the unexpected: Hippocampus mediates novelty-induced return of extinguished fear in rats. *Neurobiology of Learning and Memory*, 108:88-95.
- (65) **Maren, S.** (2014). Amygdala: contributions to fear. In M. J. Caplan (Ed.), *Reference Module in Biomedical Sciences*, Elsevier, Ireland.
- (66) Fitzgerald, P. J., Seemann, J. R., and **Maren, S.** (2014). Can fear extinction be enhanced? A review of pharmacological and behavioral findings. *Brain Research Bulletin*, 105:46-60.
- (67) **Maren, S.** (2013). Putting the brakes on fear. *Neuron*, 80:837-838.
- (68) Orsini, C. A., Yan, C., and **Maren, S.** (2013). Ensemble coding of context-dependent fear memory in the amygdala. *Frontiers in Behavioral Neuroscience*, 7(199):1-8.
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- (2) **Maren, S.** (1993). Postsynaptic factors in the expression of hippocampal long-term potentiation (LTP) *in vivo*. *Dissertation Abstracts International-B*, 54/05:2379. Doctoral thesis, University of Southern California.

- (3) **Maren, S.** (1989). Unit-activity in the amygdaloid basolateral nucleus during acquisition and overtraining of discriminative avoidance behavior in rabbits. *Undergraduate Honors Thesis*, University of Illinois at Urbana-Champaign, Rare Book and Manuscript Library, MFICHE 1989 M334.

RESEARCH MENTORING

Postdoctoral Fellows

Texas A&M University:

- 2023-pres **Flavio Mourão** (Universidade Federal de Minas Gerais, Brazil).
2022-pres **Angel David Arellano Pérez, PhD** (Universidade Federal do Rio Grande do Sul, Brazil).
2022-pres **James E. Hassell, Jr., PhD** (University of Colorado).
2018-2021 **Jianfeng Liu, PhD** (Peking University). *Currently an Assistant Professor, Wuhan University of Science and Technology, China.*
2018-2020 **Olivia Miles, PhD** (University of Vermont). *Currently a Program Manager at Beth Israel Deaconess Medical School.*
2012-2017 **Paul Fitzgerald, PhD** (Johns Hopkins University). *Currently an Assistant Research Scientist at the University of Michigan.*

University of Michigan:

- 2012-2013 **Crystal M. Erickson, PhD** (University of Texas-Dallas). *Currently a Surgical Electrophysiologist, ProNerve, LLC.*
2011-2012 **Chrystelle Sirieix, PhD** (University of Lyon). *Currently a Postdoctoral Fellow in the Department of Physiology and Neurobiology, Dartmouth University.*
2010-2011 **Jee-hyun Kim, PhD** (University of New South Wales). *Currently a DECRA Fellow and Associate Professor in the Florey Institute of Neuroscience and Mental Health, University of Melbourne, Australia.*
2009-2010 **Chun-hui Chang, PhD** (University of Michigan). *Currently a Postdoctoral Fellow in the Department of Neuroscience, University of Pittsburgh; will be appointed (F2015) an Assistant Professor, Institute of Systems Neuroscience, National Tsing Hua University, Taiwan.*
2008-2010 **Ewelina Knapska, PhD** (Nencki Institute, Warsaw). *Currently an Assistant Professor and Head of the Emotions Neurobiology Laboratory, Nencki Institute of Experimental Biology, Warsaw, Poland.*
2005-2008 **Jinzhao Ji, MD, PhD** (Shanghai Institute of Physiology). *Currently in private medical practice.*

Graduate Students (chair)

Texas A&M University (current, chair):

- 2023-pres **Kennedi Crayton**, Department of Psychological and Brain Sciences.
2021-pres **Samantha Plas**, Texas A&M Institute for Neuroscience. *co-chair, Liberzon
2021-pres **Hugo Bayer Reichmann**, Texas A&M Institute for Neuroscience.
2021-pres **Tugce Tuna**, Texas A&M Institute for Neuroscience.

Texas A&M University (past, chair):

- 2018-2024 **Rain Shelby Blair**, Department of Psychological and Brain Sciences, *co-chair Nagaya. "Role of steroid hormones and their neuroactive metabolites in Pavlovian fear conditioning." *Currently an Assistant Professor at Allegheny College.*
2018-2024 **Cecily R. Oleksiak**, Texas A&M Institute for Neuroscience. *co-chair Moscarello. "Role of ventral hippocampus in the contextual control of avoidance."
2019-2024 **Krithika "Kay" Vasudevan**, Texas A&M Institute for Neuroscience. "Thalamic modulation of hippocampal context memories during conditioned fear learning."
2017-2023 **Annalise N. Binette, PhD**, Texas A&M Institute for Neuroscience. "Prefrontal cortical regulation of stress effects on fear extinction."
2017-2022 **Michael S. Totty, PhD**, Texas A&M Institute for Neuroscience. "Thalamic coordination of prefrontal-hippocampal interactions underlying the retrieval of fear extinction memories." *Currently a Postdoctoral Fellow at the Lieber Institute, Johns Hopkins University.*

- 2017-2021 **Reed L. Ressler, PhD**, Texas A&M Institute for Neuroscience. "Synaptic and associative mechanisms mediating fear conditioning to unpredictable threats." *Currently a Research Scientist at Capsida Therapeutics.*
- 2015-2020 **Karthik R. Ramanathan, PhD**, Texas A&M Institute for Neuroscience, "Role of thalamic nucleus reuniens in Pavlovian fear conditioning and extinction." *Currently a Research Scientist at Spark Therapeutics.*
- 2013-2019 **Thomas F. Giustino, PhD**, Texas A&M Institute for Neuroscience, "Noradrenergic modulation of stress-induced deficits in fear extinction." *Awarded a predoctoral NIH NRSA (2017-19). *Currently a Medical Writer at Axiom.*
- 2012-2018 **Travis D. Goode, PhD**, Texas A&M Institute for Neuroscience, "Brain systems coordinating fear to uncertain threats." *Awarded a predoctoral NIH NRSA (2016-18). *Currently a Postdoctoral Fellow in the Department of Psychiatry, Harvard Medical School.*
- 2012-2017 **Jingji Jin, PhD**, Texas A&M Institute for Neuroscience, "Neural circuits underlying context-dependent memory retrieval." *Currently a Data Science Fellow at Insight Data Science.*
- 2013-2017 **Qian (Angie) Wang, PhD**, Department of Biology, "Exploring the role of infralimbic cortex inhibitory circuits in the context-dependent extinction and renewal of fear." *Currently an Assistant Professor in the Department of Biology, John Brown University.*
- 2012-2017 **Gillian M. Acca, PhD**, Texas A&M Institute for Neuroscience, "The interaction of progesterone and allopregnanolone with fear memories." *Currently a Health Science Policy Analyst at the National Institutes of Health.*
- 2012-2014 **Janice J. Kim, MS**, Department of Psychology, "Reversible inactivation of the bed nucleus of the stria terminalis blocks reinstatement but not renewal of extinguished fear."

University of Michigan (past, chair):

- 2007-2012 **Caitlin A. Orsini, PhD**, Department of Psychology, "Neural circuitry underlying contextual regulation of fear after extinction," 2007-2012. *Awarded a predoctoral NIH NRSA (2010-12). *Currently an Assistant Professor in the Department of Psychology, University of Texas, Austin.*
- 2005-2010 **Joshua M. Zimmerman, PhD**, Neuroscience Program, "Compensatory neural circuits for fear learning without the basolateral amygdala," 2005-2010. *Currently Compliance Applications Area Lead, Bloomberg NYC.*
- 2005-2009 **Chun-hui Chang, PhD**, Department of Psychology, "Extinction of recent fear: Behavioral and neural mechanisms," 2005-2009. *Currently an Associate Professor, Institute of Systems Neuroscience, National Tsing Hua University, Taiwan.*
- 2004-2009 **Christine A. Rabinak, PhD**, Department of Psychology, "The associative representation of fear memories mediated by the amygdala," 2004-2009. *Currently an Associate Professor, Department of Pharmacy Practice, Wayne State University.*
- 2000-2005 **Jennifer A. Hobin, PhD**, Department of Psychology, "Neural circuits for context-specific expression of pavlovian fear memory after extinction," 2001-2006. *Awarded a predoctoral National Defense Science and Engineering graduate fellowship (2001-05). *Currently a Science Policy Director, National Institute of Drug Abuse.*
- 1999-2004 **Kevin A. Corcoran, PhD**, Department of Psychology, "Participation of the dorsal hippocampus in the acquisition, expression, and context-dependency of extinction of learned fear," 1999-2004. *Awarded a predoctoral NSF GRF (2001-04). *Currently a Postdoctoral Fellow in the Department of Psychiatry, Northwestern University.*
- 1997-2002 **Ki A. Goosens, PhD**, Department of Psychology, "Conditional plasticity in the amygdala: Substrates, molecular mechanisms, and the relationship to fear behavior," 1997-2002. *Awarded a predoctoral Howard Hughes Medical Institute Graduate Fellowship (1999-2002). *Currently an Assistant Professor in Neurology, MassGeneral Institute for Neurological Disease (MIND), Massachusetts General Hospital.*