



William Giardino

Assistant Professor (Research) of Psychiatry and Behavioral Sciences (Sleep Medicine)
Psychiatry and Behavioral Sciences - Sleep Medicine

 Curriculum Vitae available Online

Bio

BIO

Dr. Giardino is Assistant Professor in the Department of Psychiatry and Behavioral Sciences, Principal Investigator of the Giardino Laboratory, and faculty member of the Wu Tsai Neurosciences Institute, Center for Sleep and Circadian Sciences, Bio-X, and Maternal Child and Health Research Institute at the Stanford University School of Medicine. He earned a B.Sc. in Psychology from the University of Washington, a Ph.D. in Behavioral Neuroscience from Oregon Health & Science University, and completed postdoctoral training at Stanford.

Dr. Giardino's research program is funded by federal NIH and private foundation grants that aim to uncover the neurobiological mechanisms driving maladaptive changes in stress reactivity and sleep/wake architecture that facilitate substance use disorders. He previously received F31 and F32 NIH NRSA fellowships and a K99 NIH Pathway to Independence career development award to fund training on the neural circuit mechanisms of peptide signaling molecules in stress and addiction.

Dr. Giardino serves as an academic and research mentor for numerous undergraduate, graduate level, and postdoctoral trainees, and is active in teaching neuroscience coursework at Stanford. In addition, he serves as faculty chair of the committee on Diversity, Equity, Inclusion, and Belonging for the Stanford Neurosciences PhD program.

The Giardino Laboratory aims to decipher the neural mechanisms underlying psychiatric conditions of stress, addiction, and sleep disturbances. To accomplish this, our work is distinguished by expert proficiency with genetic, physiological, neuroanatomical, viral, pharmacological, and computational approaches applied in rodent animal models. We leverage these strategies to monitor, manipulate, and map the neural circuits, synapses, and signaling mechanisms that drive approach/avoidance behaviors, drug-seeking, food intake, social interactions, and sleep/wake arousal states. We are especially focused on the behavioral functions of modulatory neuropeptide molecules acting throughout the circuitry of the extended amygdala, particularly in a heterogeneous region called the bed nucleus of the stria terminalis (BNST).

ACADEMIC APPOINTMENTS

- Assistant Professor (Research), Psychiatry and Behavioral Sciences - Sleep Medicine
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

PROFESSIONAL EDUCATION

- PhD, Oregon Health and Science University , Behavioral Neuroscience
- BS, University of Washington , Psychology

LINKS

- Giardino Laboratory: <https://giardinolab.org>
- Google Scholar: http://scholar.google.com/citations?user=AG8_N7kAAAAJ&hl=en

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Giardino Laboratory in Stanford's Department of Psychiatry and Behavioral Sciences and Wu Tsai Neurosciences Institute. We aim to decipher the neural mechanisms underlying psychiatric conditions of stress, addiction, and sleep disturbances. Our work uses genetic, pharmacological, physiological, anatomical, optical, and computational approaches in freely-behaving mice to monitor, manipulate, and map the neural circuits, synapses, and signaling mechanisms that drive approach/avoidance behaviors, drug-seeking, food intake, social interactions, and sleep/wake cycles.

Research Topics:

Stress & Reward

Alcohol Addiction

Sex Differences

Wakefulness/Arousal

Neuropeptide Release & Signaling

Feeding & Metabolism

Research Approaches:

Neuromodulation (optogenetics, chemogenetics)

Neurophysiological recordings (fiber photometry, calcium imaging, EEG/EMG)

Neurogenetics (CRISPR/Cas9 editing, Cre/loxP recombination, viral gene transfer, mouse genetics)

Neuroanatomy (circuit tracing, immunohistochemistry, in situ hybridization, confocal & light sheet microscopy)

Neuropharmacology (alcohol & drug self-administration, receptor mechanisms)

Computation (neural circuit modeling, machine learning analysis of behavioral & physiological datasets)

Behavior and Evolution (rodent model organisms, cross-species comparisons)

Translation (interdisciplinary and clinical collaborations, mental health treatment development)

Teaching

COURSES

2022-23

- The Neuroscience of Stress and Reward: Circuit Fundamentals of Emotional Arousal: PSYC 52N (Aut)

2021-22

- The Neuroscience of Stress and Reward: Circuit Fundamentals of Emotional Arousal: PSYC 52N (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Sedona Ewbank

Postdoctoral Faculty Sponsor

Brittany Bush, Yihe Ma

Doctoral Dissertation Advisor (AC)

Allison Morningstar

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **Amygdala neurocircuitry at the interface between emotional regulation and narcolepsy with cataplexy** *FRONTIERS IN NEUROSCIENCE*
Sardar, H., Goldstein-Piekarski, A. N., Giardino, W. J.
2023; 17
- **Neural circuit mechanisms of the cholecystokinin (CCK) neuropeptide system in addiction.** *Addiction neuroscience*
Ma, Y., Giardino, W. J.
2022; 3
- **Zooming into the Lab: Perspectives on Maintaining Undergraduate Biological Research through Computationally Adapted Remote Learning in Times of Crisis.** *Journal of microbiology & biology education*
Parrington, B. A., Giardino, W. J.
2021; 22 (1)
- **Extended Amygdala Neuropeptide Circuitry of Emotional Arousal: Waking Up on the Wrong Side of the Bed Nuclei of Stria Terminalis.** *Frontiers in behavioral neuroscience*
Giardino, W. J., Pomrenze, M. B.
2021; 15: 613025
- **Parallel circuits from the bed nuclei of stria terminalis to the lateral hypothalamus drive opposing emotional states.** *Nature neuroscience*
Giardino, W. J., Eban-Rothschild, A., Christoffel, D. J., Li, S., Malenka, R. C., de Lecea, L.
2018
- **Control of chronic excessive alcohol drinking by genetic manipulation of the Edinger-Westphal nucleus urocortin-1 neuropeptide system** *TRANSLATIONAL PSYCHIATRY*
Giardino, W. J., Rodriguez, E. D., Smith, M. L., Ford, M. M., Galili, D., Mitchell, S. H., Chen, A., Ryabinin, A. E.
2017; 7: e1021
- **VTa dopaminergic neurons regulate ethologically relevant sleep-wake behaviors.** *Nature neuroscience*
Eban-Rothschild, A., Rothschild, G., Giardino, W. J., Jones, J. R., de Lecea, L.
2016; 19 (10): 1356-1366
- **Hypocretin (orexin) neuromodulation of stress and reward pathways** *CURRENT OPINION IN NEUROBIOLOGY*
Giardino, W. J., de Lecea, L.
2014; 29: 103-108
- **Dissociation of corticotropin-releasing factor receptor subtype involvement in sensitivity to locomotor effects of methamphetamine and cocaine** *PSYCHOPHARMACOLOGY*
Giardino, W. J., Mark, G. P., Stenzel-Poore, M. P., Ryabinin, A. E.
2012; 219 (4): 1055-1063
- **Corticotropin-releasing factor: innocent until proven guilty.** *Nature reviews. Neuroscience*
Giardino, W. J., Ryabinin, A. E.
2012; 13 (1): 70-?
- **Gray areas: Neuropeptide circuits linking the Edinger-Westphal and Dorsal Raphe nuclei in addiction.** *Neuropharmacology*
Pomrenze, M. B., Walker, L. C., Giardino, W. J.
2021: 108769

- **Arousal-state dependent alterations in VTA-GABAergic neuronal activity.** *eNeuro*
Eban-Rothschild, A. n., Borniger, J. C., Rothschild, G. n., Giardino, W. J., Morrow, J. G., de Lecea, L. n.
2020
- **High-Resolution Spectral Sleep Analysis Reveals a Novel Association Between Slow Oscillations and Memory Retention in Elderly Adults.** *Frontiers in aging neuroscience*
Kawai, M. n., Schneider, L. D., Linkovski, O. n., Jordan, J. T., Karna, R. n., Pirog, S. n., Cotto, I. n., Buck, C. n., Giardino, W. J., O'Hara, R. n.
2020; 12: 540424
- **The nucleus accumbens and alcoholism: a target for deep brain stimulation** *NEUROSURGICAL FOCUS*
Ho, A. L., Salib, A. N., Pendharkar, A., Sussman, E. S., Giardino, W. J., Halpern, C. H.
2018; 45 (2): E12
- **Optical Probing of Orexin/Hypocretin Receptor Antagonists.** *Sleep*
Li, S. B., Nevárez, N. n., Giardino, W. J., de Lecea, L. n.
2018
- **To sleep or not to sleep: neuronal and ecological insights.** *Current opinion in neurobiology*
Eban-Rothschild, A., Giardino, W. J., de Lecea, L.
2017; 44: 132-138
- **Contribution of Urocortin to the Development of Excessive Drinking** *ROLE OF NEUROPEPTIDES IN ADDICTION AND DISORDERS OF EXCESSIVE CONSUMPTION*
Ryabinin, A. E., Giardino, W. J., Thiele, T. E.
2017; 136: 275-91
- **Hypocretins and Arousal.** *Current topics in behavioral neurosciences*
Li, S., Giardino, W. J., de Lecea, L.
2016
- **Resting easy with a sleep regulator** *ELIFE*
Giardino, W. J., de Lecea, L.
2015; 4
- **CRF1 Receptor Signaling Regulates Food and Fluid Intake in the Drinking-in-the-Dark Model of Binge Alcohol Consumption** *ALCOHOLISM-CLINICAL AND EXPERIMENTAL RESEARCH*
Giardino, W. J., Ryabinin, A. E.
2013; 37 (7): 1161-1170
- **Stress-Related Neuropeptides and Addictive Behaviors: Beyond the Usual Suspects** *NEURON*
Schank, J. R., Ryabinin, A. E., Giardino, W. J., Ciccocioppo, R., Heilig, M.
2012; 76 (1): 192-208
- **Urocortins: CRF's siblings and their potential role in anxiety, depression and alcohol drinking behavior** *ALCOHOL*
Ryabinin, A. E., Tsoory, M. M., Kozicz, T., Thiele, T. E., Neufeld-Cohen, A., Chen, A., Lowery-Gionta, E. G., Giardino, W. J., Kaur, S.
2012; 46 (4): 349-357
- **Characterization of genetic differences within the centrally projecting Edinger-Westphal nucleus of C57BL/6J and DBA/2Jmice by expression profiling** *FRONTIERS IN NEUROANATOMY*
Giardino, W. J., Cote, D. M., Li, J., Ryabinin, A. E.
2012; 6
- **Urocortin-1 within the Centrally-Projecting Edinger-Westphal Nucleus Is Critical for Ethanol Preference** *PLOS ONE*
Giardino, W. J., Cocking, D. L., Kaur, S., Cunningham, C. L., Ryabinin, A. E.
2011; 6 (10)
- **Dissection of corticotropin-releasing factor system involvement in locomotor sensitivity to methamphetamine** *GENES BRAIN AND BEHAVIOR*
Giardino, W. J., Pastor, R., Anacker, A. M., Spangler, E., Cote, D. M., Li, J., Stenzel-Poore, M. P., Phillips, T. J., Ryabinin, A. E.
2011; 10 (1): 78-89

- **Activation of the kappa opioid receptor in the dorsal raphe nucleus mediates the aversive effects of stress and reinstates drug seeking** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Land, B. B., Bruchas, M. R., Schattauer, S., Giardino, W. J., Aita, M., Messinger, D., Hnasko, T. S., Palmiter, R. D., Chavkin, C.
2009; 106 (45): 19168-19173