

Victor A. Cazares

Assistant Professor | Psychology Department | Williams College

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[Bibliography](#)

Research Focus

My research is focused on studying how interactions between genetic background and the environment result in neurophysiological changes that alter risk or resiliency for psychiatric disease. This is achieved by comparing the behavior of distinct mouse strains, with unique genetic background, where some strains innately exhibit maladaptive traits and others do not. I leverage differences in strain-specific behavior to establish how neurophysiological features (and genes) are associated with adaptive vs. maladaptive traits. The ultimate goal is to identify mechanisms that underlie the maladaptive symptoms associated with human psychiatric illness (i.e. depression, anxiety, schizophrenia) to stimulate the development of new therapeutic approaches.

Education

Ph.D. & M.S. in Neuroscience University of Michigan	2009-2015 Ann Arbor, MI, USA
M.A. in Psychology California State University, Los Angeles	2007-2009 Los Angeles, CA.
B.A. in Psychology California State University, Los Angeles	2005-2007 Los Angeles, CA.
A.A. in Psychology Fullerton Community College, Fullerton	2003-2005 Fullerton, CA.

Positions

Assistant Professor Psychology Department, Williams College	2020-Present Williamstown, MA. Lab Website
IRACDA Research Fellow Molecular & Integrative Physiology, University of Michigan	2016-2020 Ann Arbor, MI. Murphy Lab
Postdoctoral Fellow Neuroscience Department, New York University	2015-2016 New York, NY. Basu Lab



Grants & Fellowships

- **Stern Strategic Translational Research Award (\$10,000)** 2019
Depression Center, University of Michigan Medical School.
- **The [Institutional Research and Academic Career Development Award \(K12\)](#)** 2017-2019
National Institutes of General Medical Sciences
- **[BRAINS](#) Fellowship** 2017-2018
National Institutes of Neurological Disorders & Stoke
- **Ruth L. Kirschstein National Research Service Award (F31)** 2012-2015
National Institutes of Neurological Disorders & Stoke
- **Neuroscience Scholars Fellowship** 2011-2013
Society for Neuroscience
- **Rackham Graduate Student Research Grant (\$3,000)** 2011
University of Michigan
- **Marine Biological Laboratory Scholarship** 2011
Society for Cell Biology; Howard Hughes Medical Institute; William Townsend Porter Scholarship
- **Rackham Merit Fellowship,** 2009-2011
Rackham Graduate School, University of Michigan
- **MBRS-RISE Fellowship** 2008
National Institutes of Health, California State University
- **Roffe Scholarship in Psychology (\$1,000)** 2008
Psychology Department, C California State University

Awards

- **Outstanding Postdoctoral Fellow Award** 2019
Rackham Graduate School, University of Michigan
- **Trainee Professional Development Award** 2018
Society for Neuroscience
- **Postdoctoral-Travel Award** 2017
Society Advancing Chicanos and Native Americans in Science (SACNAS)
- **Postdoctoral-Travel Award** 2017
BIG Ten Academic Alliance Professorial Advancement Initiative
- **Award for Best Poster Presentation** 2012
Annual Meeting, Michigan Society for Neuroscience
- **Award for Best Oral Presentation** 2011
School of Medicine Postgraduate Day Symposium, Trinity College Dublin, Ireland.
- **Award for Best Oral Presentation in Biological Sciences** 2009
Statewide CSU Research & Scholarship Symposium

Teaching

- **Instructor, Anatomy and Physiology I (Bio 233),** 2019
Biology Department, Henry Ford College
- **Instructor, Intro to Molecular Neurobiology and Neurophysiology (NS623),** 2016-2018
Neuroscience Graduate Program, University of Michigan
- **Certificate of Completion for Postdoctoral Course on College Science Teaching.** 2018
Center for Research, Learning and Teaching, University of Michigan
- **Graduate Teaching Assistant, Human Physiology (Phys201),** 2011
Molecular and Integrative Physiology, University of Michigan

Mentoring

- **Genesis Rodriguez, Post-Baccalaureate student** 2018-2019
University of Michigan PREP Program grodriguez24v@gmail.com
Current position: Ph.D. student in Neuroscience, University of Michigan
Publications in 2019, 2020
- **Kaitlyn Gordon, Undergraduate Student** 2017-2018
Kalamazoo College Kaitlyn.Gordon14@kzoo.edu
Senior Thesis: Distinct neuronal activation in medial-prefrontal cortex between wild-type inbred mouse strains during fear extinction learning.
Current position: Ph.D. student in Neuroscience, Michigan State

Leadership & Service

- **Reviewing Editor** 2020-
Frontiers in Behavioral Neuroscience
- **Workshop on "How to conduct a poster presentation"** 2020
2020 Meeting for the Liberal Arts Network for Development, ([LAND](#))
- **Awards Judge for Poster Presentations** 2018
Michigan Society for Neuroscience, Annual Meeting
- **Awards Judge for Poster & Graduate Student Oral Presentations** 2018
Society Advancing Chicano and Native American Students
- **Neurophysiology Journal Club** 2016- 2019
Creator and coordinator (over 60 subscribed members), University of Michigan
- **Presenter for "Science Career Pathways: From Community College to Graduate School".** 2016-2017
15 presentations to high-school and community college students at campuses in the Wayne College community district in Detroit, MI.
- **BP-ENDURE Program student mentor,** University of Michigan 2013
- **Ad-hoc Reviewer,** Cerebral Cortex (2013); Behavioral Brain Research (2019) 2013-Present
- **Rackham Fellow Peer Mentoring Program,** University of Michigan 2012
- **Neuroscience Symposium Executive Coordinator,** Annual Neuroscience Symposium, University of Michigan 2012
- **Brains Rule Workshop Leader,** K12 outreach event, University of Michigan 2011

• **Committee Member, “Instructionally Related Activities”**, Cal State Los Angeles:
The purpose of the committee was to advise the President of the university regarding
proposal funding decisions and funding level.

2009

Publications

Peer-reviewed Journal Articles:

1. Deficits across multiple behavioral domains align with susceptibility to stress in 129S1/SvImJ mice. 2020

^*Rodriguez G, *Moore S, Neff RC, Glass E, Stevenson TK, Stinnett GS, Seasholtz AF, Murphy GG, Cazares VA. *Neurobiology of Stress*. DOI [10.1016/j.ynstr.2020.100262](https://doi.org/10.1016/j.ynstr.2020.100262)

2. Turning strains into strengths for understanding neuropsychiatric illness. 2020

Moore S, Murphy GG, Cazares VA.
Molecular Psychiatry. PMID: [32404949](https://pubmed.ncbi.nlm.nih.gov/32404949/) | DOI [10.1038/s41380-020-0772-y](https://doi.org/10.1038/s41380-020-0772-y)

3. Development of low-cost cardiac and skeletal muscle lab activities to teach physiology concepts and the scientific method. 2020

*Judge J, * Cazares VA, Thompson, Z, Skidmore L.
Advances in Physiology Education. PMID: [32243218](https://pubmed.ncbi.nlm.nih.gov/32243218/) | DOI: [10.1152/advan.00149.2019](https://doi.org/10.1152/advan.00149.2019)

4. Environmental variables that ameliorate extinction learning in the 129S1/SvImJ mouse strain. 2019

Cazares VA, ^Rodriguez G, Parent R, Ouilette L, Glanowska K, Moore S, Murphy GG.
Genes, Brain and Behavior. PMID: [PMC6718342](https://pubmed.ncbi.nlm.nih.gov/32243218/) | DOI: [10.1111/gbb.12575](https://doi.org/10.1111/gbb.12575)

5. The ubiquitin-proteasome system functionally links neuronal tomosyn-1 to dendritic morphology. 2017

Saldate JJ, Shiao J, Cazares VA, Stuenkel EL.
Journal of Biological Chemistry. PMID: [PMC5818180](https://pubmed.ncbi.nlm.nih.gov/28118180/) | DOI: [10.1074/jbc.M117.815514](https://doi.org/10.1074/jbc.M117.815514)

6. Dynamic Partitioning of Synaptic Vesicle Pools by the SNARE-binding Protein Tomosyn. 2016

Cazares VA, Subramani A, Manly A, Stuenkel EL.
Journal of Neuroscience. PMID: [PMC5148239](https://pubmed.ncbi.nlm.nih.gov/265148239/) | DOI: [10.1523/JNEUROSCI.1297-16.2016](https://doi.org/10.1523/JNEUROSCI.1297-16.2016)

Also see in Journal of Neuroscience “Journal Club” an article written about this publication: [“How do synaptic vesicles “know which pool they belong to?”](#) by Fabrizia Guarnieri

7. Distinct action of Rab3 and Rab27 GTPases on late stages of exocytosis of insulin. 2014

Cazares VA, Subramani A, Saldate JJ, Hoerauf H, Stuenkel EL.
Traffic. PMID: [PMC4140954](https://pubmed.ncbi.nlm.nih.gov/24140954/) | DOI: [10.1111/tra.12182](https://doi.org/10.1111/tra.12182)

8. CUL4-DDB1-CDT2 E3 Ligase Regulates the Molecular Clock Activity by Promoting Ubiquitination-Dependent Degradation of the Mammalian CRY1. 2014

Tong X, Zhang D, Guha A, Arthurs B, Cazares V, Gupta N, Elias CF, Yin L.
PLoS One. PMID: [PMC4592254](https://pubmed.ncbi.nlm.nih.gov/24592254/) | DOI: [10.1371/journal.pone.0139725](https://doi.org/10.1371/journal.pone.0139725)

9. Pharmacological correction of obesity-induced autophagy arrest using calcium channel blockers. 2014

Park H, Semple I, Jang I, Ro S, Kim M, **Cazares V**, Stuenkel E, Kim J, Kim JS, Lee JH.
Nature Communications. PMID: [PMC4157315](https://pubmed.ncbi.nlm.nih.gov/25731573/) | DOI: [10.1038/ncomms5834](https://doi.org/10.1038/ncomms5834)

10. Efficient transfection of dissociated mouse chromaffin cells using small-volume electroporation. 2014

Hoerauf WW, **Cazares VA**, Subramani A, Stuenkel EL. *Cytotechnology*. PMID: [PMC4371572](https://pubmed.ncbi.nlm.nih.gov/24371572/)

11. Basolateral amygdala lesions facilitate reward choices after negative feedback in rats. 2013

Izquierdo A, Darling C, Manos N, Pozos H, Kim C, Ostrander S, **Cazares V**, Stepp H, Rudebeck P.
Journal of Neuroscience. PMID: [PMC3606920](https://pubmed.ncbi.nlm.nih.gov/23606920/) | DOI: [10.1523/JNEUROSCI.4942-12.2013](https://doi.org/10.1523/JNEUROSCI.4942-12.2013)

12. Orbitofrontal cortex and basolateral amygdala lesions result in suboptimal and dissociable reward choices on cue-guided effort in rats. 2011

Ostrander S, **Cazares VA**, Kim C, Cheung S, Gonzalez I, Izquierdo A.
Behavioral Neuroscience. PMID: [PMC3111944](https://pubmed.ncbi.nlm.nih.gov/23111944/) | DOI: [10.1037/a0023574](https://doi.org/10.1037/a0023574)

13. Reversal-specific learning impairments after a binge regimen of methamphetamine in rats: possible involvement of striatal dopamine. 2010

Izquierdo A, Belcher AM, Scott L, **Cazares VA**, Chen J, O'Dell SJ, Malvaez M, Wu T, Marshall JF.
Neuropsychopharmacology. PMID: [PMC2795129](https://pubmed.ncbi.nlm.nih.gov/2795129/) | DOI: [10.1038/npp.2009.155](https://doi.org/10.1038/npp.2009.155)

Book Chapters:

14. Neural Plasticity of the Amygdala. 2020

Cazares VA, Murphy GG.
Handbook of Behavioral Neuroscience. Ed. by J.H. Urban, and A. Rosenkranz. Elsevier Publishing.
DOI: <https://doi.org/10.1016/B978-0-12-815134-1.00005-2>.

15. Molecular controls on regulated neurotransmitter and neurohormone secretion. 2020

Cazares VA, Steunkel EL.
Neurosecretion: Secretory Mechanisms. Ed. by J.R. Lemos, and G. Dayanithi. Springer Nature Publishing.
DOI: <https://doi.org/10.1007/978-3-030-22989-4>.

Journal Articles in Review or in Preparation:

16. Unique Roles of L-Type Calcium Channel Subtypes in Homeostatic Synaptic Scaling. 2020

Chen A, Rice SP, Moore SJ, **Cazares VA**, Murphy GG, Sutton M. Under Review.

* **Denotes Co-first author**

^ **Denotes student researcher**

Conference Abstracts & Presentations

Invited Talks

- **“Turning Strains into Strengths for Understanding Psychiatric Disease”** 2019
Bowdoin College, Brunswick, ME.
- **“Turning Strains into Strengths for Understanding Psychiatric Disease”** 2019
Williams College, Williamstown, MA.
- **“Investigating the Neural Basis of Neuropsychiatric Diseases by Exploiting the Genetics of Inbred Mouse Strains”** 2018
Hope College, Holland, MI.
- **Keynote address: From Community College Research to Graduate School and Beyond. Summer Research Opportunities Conference, Henry Ford College, Dearborn, MI.** 2018
- **A novel inhibitory pathway modulates the fraction of release-competent vesicles.** Exocytosis and Endocytosis Subgroup Symposium, Biophysical Society 57th Annual Meeting. 2014
- **Specific actions of Rab3 and Rab27 on late stages of Ca²⁺-regulated exocytosis of insulin.** 2013
Midwest Islet Club 6th Annual Meeting.
- **Defining how presynaptic molecular interactions dynamically regulate neurotransmission.** 2011
School of Medicine Postgraduate Symposium. Trinity College, Dublin.
- **Orbitofrontal cortex lesions impair responses to cue predicting shifts in work to reward.** 2009
Biomedical Sciences Research Symposium. California State University, Los Angeles.

Selected Conference Abstracts

1. **Novelty-facilitated extinction ameliorated maladaptive fear learning in the 129S1 mouse strain.** Cazares VA, et al. Society for Neuroscience. [074.16 / U26](#) 2019
2. **The role of diminished motivation in extinguishing fear responses to environmental stimuli** 2019
Cazares VA, et al. Molecular & Cellular Cognition Society, Annual Meeting.
3. **Neural mechanisms underlying impaired extinction learning in a wild-type inbred mouse strain.** Cazares VA, et al. Society for Neuroscience. [415.09/BBB14](#) 2018
4. **Distinct neuronal activation in medial-prefrontal cortex between wild-type inbred mouse strains during fear extinction learning.** Cazares VA, et al. Society for Neuroscience. [605.006/0033](#) 2017
5. **A presynaptic activity repressor regulates the fraction of release-competent vesicles.** 2014
Cazares VA, et al. Gordon Conference: Synaptic Transmission.
6. **A novel inhibitory pathway modulates the fraction of release-competent vesicles .** 2014
Cazares VA, et al. Biophysical Society. [1589/B319](#)
7. **Tomosyn and CDK5: A protein duet acting in concert to direct release properties of synaptic vesicles.** Cazares VA, et al. Society for Neuroscience. [424.10/G47](#) 2013
8. **Tomosyn and CDK5 act in concert to direct release properties of synaptic vesicles and to facilitate homeostatic plasticity.** Cazares VA, et al. Michigan Chapter Society for Neuroscience, A74. 2013

9. **Tomosyn orchestrates vesicle pools at hippocampal synapses to tune neurotransmission.** 2012
Cazares VA, et al. *Society for Neuroscience*. [334.05/D40](#).
10. **Rab27A modulates priming of large dense-core vesicles in mouse chromaffin cells.** 2010
Cazares VA, et al. *Society for Neuroscience*. [241.3/F43](#).
11. **Orbitofrontal cortex lesions impair responses to cue-predicted changes in work-to-reward in rats.** 2009
Cazares VA, et al. *Society for Neuroscience*. [476.3/FF43](#)

Research Experience

The arch of my research experience has been crafted to attain expertise that span cellular, molecular, and behavioral neuroscience. These qualifications position me to conduct integrative work focused on establishing circuit and molecular mechanisms underlying maladaptive behavior.

My initial graduate work (M.A. in Psychology) was focused on establishing the functional role of the orbitofrontal cortex and amygdala in cost-benefit analysis during decision making. This research is of great clinical value since poor cost-benefit analysis is a defining characteristic of drug addiction and other psychiatric disorders. During this time, I helped establish a new behavioral task that assessed cost-benefit decision making by defining the threshold amount of work or effort that rats will perform for defined food rewards. These studies, which resulted in three publications and a few awards and fellowships, were able to define key brain regions and dynamics involved in cost-benefit analysis and their role in drug-addiction.

My Ph.D. thesis research revealed a new signaling pathway that modulates neurotransmitter release as a function of overall network activity. Specifically, I discovered that the protein tomosyn can sequester synaptic vesicles in a resting, non-releasable vesicle pool and that its function is regulated by neural activity and the kinase CDK5. Interestingly, mutations in tomosyn have been implicated in autism spectrum disorder (Davis et al., 2009); however, its exact function in disease remains unknown. As part of this work, I established a hippocampal neuron culturing system and several optical techniques to measure physiological changes in neurons for Dr. Edward Stuenkel's laboratory. My work and expertise led to three first-author publications, several grants and awards including the NIH NRSA (F31) and the Neuroscience Scholars Fellowship from the Society for Neuroscience. Finally, I was also a co-author in four published papers as a result of collaborative projects.

As a postdoctoral fellow, my research has established a novel behavioral paradigm which reduces *maladaptive* fear in 129S1 mice, an inbred mouse strain which models some features of post-traumatic stress disorder (Cazares et al., 2019). In humans, fear and anxiety can be reduced by repeated exposure to stimuli which triggers fear, referred to as "exposure therapy". Similarly, the behavioral paradigm I have developed uses repeated exposure to the fear conditioned stimuli, but pairs it with multiple novel stimuli. The pairing of fear conditioned stimuli with neutral novel stimuli I believe enhances the engagement of neural circuits responsible for decoupling fear responses from conditioned stimuli (i.e. the medial prefrontal cortex). This hypothesis is supported by recent neuroimaging study in humans (Dunsmoor et al., 2019), which similarly shows that (1) introducing novel stimuli is more effective at reducing fear and (2) that protocols like **NFE** engage neural circuitry differently than standard extinction protocols. My postdoc work resulted in two publications and two additional articles are in review (see above). I have also received direct research funding from the Stern Strategic Translational Research Award to support my current work on the neurophysiology of **NFE**. Finally, I have also been awarded other fellowships including the NIH IRACDA (K12) award and the NIH BRAINS fellowship.

My lab at Williams College is now focused on determining what neural circuits are responsible for the reduction of fear using **NFE**. To achieve this, I am using a variety of techniques including labeling of active neural populations; silencing or activating neural circuits with chemogenetics; and imaging neural dynamics during learning with miniaturized endoscopes. In addition, we are also using strain differences to model "anhedonia", or the loss of pleasure or motivation, a common *maladaptive* trait in humans who have been diagnosed with depression or anxiety-related disorders.

References

Geoff Murphy, Ph.D. (*Postdoc Research Advisor*)

Professor, Molecular and Integrative Physiology
Professor, Molecular and Behavioral Neuroscience Institute
Former Director, Neuroscience Graduate Program
Medical School, University of Michigan, Ann Arbor, MI.
murphyg@umich.edu | (734) 936-8926

David Sept, M.D., Ph.D. (*IRACDA Director*)

Professor and Associate Chair, Biomedical Engineering
Medical School, University of Michigan, Ann Arbor, MI.
dsept@umich.edu | 734-615-9587

Edward Stuenkel, Ph.D. (*Ph.D. Research Advisor*)

Professor, Molecular & Integrative Physiology
Medical School, University of Michigan, Ann Arbor
Dean, College of Health and Life Sciences
Hamad Bin Khalifa University, Education City, Qatar
edstuenkel@gmail.com | +974 5080 8955

Lynnda Skidmore, Ph.D. (*Postdoc Teaching Advisor*)

Professor, Biology Department
Wayne Country Community College, Detroit
lskidmo1@wcccd.edu | (248) 376-5783

Alicia Izquierdo, Ph.D. (*M.A. Research Advisor*)

Associate Professor, Psychology Department
University of California, Los Angeles
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