

# Jonathan Paul Fadok, Ph.D.

## Curriculum vitae

May 29, 2024

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## EDUCATION

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- 2010 **PhD** in Neurobiology and Behavior, University of Washington, Seattle, WA. *Advisor: Richard Palmiter, PhD*
- 2000 **BA** in Anthropology (*magna cum laude*), University of Arizona

## PROFESSIONAL APPOINTMENTS AND EMPLOYMENT

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- 2024- **Research Neuroscientist**, Southeast Louisiana Veterans Health Care System (SLVHCS), New Orleans, LA. *Expected start date July 1, 2024.*
- 2020-pres **Burk-Kleinpeter Early Career Professorship in Science & Engineering**, Tulane University
- 2017-pres **Assistant professor**, Department of Psychology, Tulane University
- 2017-pres **Faculty member**, Tulane Brain Institute, Tulane University
- 2010-2017 **Postdoctoral fellow**, Neurobiology, Friedrich Miescher Institute for Biomedical Research, Basel, Switzerland. *Advisor: Andreas Lüthi, PhD*
- 2001-2004 **Research technician**, Department of Physiology and Biophysics, University of Washington. *Supervisors: Eberhard Fetz, PhD and Steve Perlmutter, PhD.*

## GRANTS

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### Current:

- 2020-2024 **Neural circuits regulating flight and panic behavior** (R01 MH122561), *National Institute of Mental Health*, \$2,241,902. Role: Principal Investigator. 03/01/2020-12/31/2024

The goal of this project is to identify how neuronal circuits control transitions between diverse types of defensive behaviors.

- 2023-2024 **Diversity supplement: Neural circuits regulating flight and panic behavior** (R01 MH122561-04S1), *National Institute of Mental Health*, \$152, 136. Role: Principal Investigator. 02/01/2023-12/31/2024

The goal of this supplement is to support the research training and professional development of my graduate student, Kasey Anderson, who is an underrepresented minority.

2024-2028 **Neuronal circuits regulating aversive salience, defensive behavior, and hyperarousal** (IO1 BX006434-01A1), *Veterans Health Administration*, \$1,075,134. Role: Principal Investigator. 07/01/2024-06/30/2028

*A Notice of Intent to Fund has been issued for this VA Merit award. Funding will be disbursed after receipt and approval of Just in Time documents.*

The goal of this project is to identify the role of the cholinergic system during acquisition of fear and its role in developing trauma-induced hyperarousal.

### **Submitted:**

2024-2026 **Neurobiology of defensive response scaling to aggression** (R21), *National Institute of Neurological Disorders and Stroke/National Institute of Mental Health*, \$306,000. Role: Co-Investigator. 10/1/2-24-9/30/2026

The goal of this proposal is to explore how neural circuits mediate trauma-induced aggression.

2025-2029 **Neural circuits regulating flight and panic behavior** (R01 MH122561 competitive renewal), *National Institute of Mental Health*, \$2,542,668. Role: Principal Investigator. 01/01/2025-12/31/2029

The goal of this project is to identify how neuronal circuits control transitions between diverse types of defensive behaviors.

### **Completed:**

2021-2022 **Microelectrode Array Insertion System using Ultrasonic Vibration to Improve Insertion Mechanics, Reduce Tissue Dimpling and Trauma, and Improve Placement Precision in the Neocortex** (R44 NS105500), *National Institute of Neurological Disorders and Stroke*, \$60,000, Role: Sub Principal Investigator (PI: Mulvihill). 7/1/2021-6/30/2022

The goal of this project was to evaluate the efficacy and benefits of using ultrasonic vibration to insert shape memory neural implants in the mouse amygdala.

2021-2022 **The role of bottom-up noradrenergic signaling in mediating hyperarousal following trauma**, *Priddy Family Spark Research Award*, Tulane Brain Institute, \$50,000. Role: Principal Investigator (PIs: Fadok, Tasker). 6/1/2021-6/30/2022

The goal of this project was to understand how ascending information from the interoceptive hindbrain to the amygdala and hypothalamus contributes to altered behavior and physiology following trauma.

2018-2021 **Neuronal Mechanisms Controlling the Scalability of Fear** (LEQSF (2018-21)-RD-A-17), *Research Competitiveness Subprogram Grant*, Louisiana Board of Regents, \$157,639. Role: Principal Investigator. 6/1/2018-6/1/2021

The goal of this project was to acquire preliminary data related to how neuronal circuits regulate the intensity of fear reactions.

2018-2019 **Determining the Neuronal Correlates of Fear Intensity using Advanced Neurotechnology**, *Marko Spark Research Innovation Award*, Tulane Brain Institute Research Fund, \$50,000. Role: Principal Investigator (PIs: Fadok, Mostany). 7/1/2018-6/30/2019

The goal of this project was to implement deep-brain calcium imaging to determine the neuronal encoding of fear and anxiety states.

2018-2019 **Neurophysiological Correlates of Fear and Anxiety in the Central Amygdala**, *Carol Lavin Bernick Faculty Grant*, Senate Committee on Research, \$10,000. Role: Principal Investigator. 5/1/2018-4/30/2019

The goal of this project was to record neuronal activity in the central amygdala during behavioral assays of fear and anxiety.

2015-2016 **The role of CRF projection pathways in active fear responding**, *NARSAD Young Investigator Award*, Brain and Behavior Research Foundation, \$70,000. Role: Principal Investigator. 1/1/2015-12/31/2016

The goal of this project was to define the role of specific amygdala projection pathways in flight responses.

2012-2013 **Understanding the function of amygdala to basal forebrain projections using novel virus-based strategies and optogenetics** (ALTF 952-2011), *Long-term Fellowship*, European Molecular Biology Organization, 116,062 CHF (~\$120,000). Role: Postdoctoral Fellow. 1/1/2012-10/1/2013

The goal of this project was to define the role of amygdala projections to the basal forebrain in arousal and attention.

2007-2009 **Determining the role of dopamine in fear conditioning** (PHS NRSA 2T32 GM007270), *Ruth L. Kirschstein National Research Service Award*, National Institute of General Medical Sciences, \$100,000. Role: Graduate student. 1/1/2007-12/31/2009

This NRSA to support my dissertation research was awarded after a competitive interview process.

## ACADEMIC AND PROFESSIONAL HONORS AND AWARDS

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2024 **Early Career Professor – All Around**, School of Science and Engineering, Tulane

- 2021 **Associate Membership**, American College of Neuropsychopharmacology
- 2021 **Investigator**, Intramural Program for Non-clinician Scientists (BLRD), Department of Veteran's Affairs
- 2020 **Burk-Kleinpeter Early Career Professorship in Science & Engineering**, Tulane
- 2020 **Junior Faculty R01 Award**, School of Science and Engineering, Tulane
- 2020 **Largest New Grant Award**, School of Science and Engineering, Tulane
- 2020 **Research Fellowship**, University Senate Committee on Research, Tulane
- 2018 **Travel Award**, American College of Neuropsychopharmacology
- 2018 **Faculty Networking Seminar**, Provost's Office, Tulane
- 2018 **Travel Grant for Emerging Faculty**, National Science Foundation and Louisiana Board of Regents
- 2017 **Travel Grant**, Committee on Research Faculty and Tulane University Provost's Office
- 2015 **Young Investigator Award**, Brain and Behavior Research Foundation
- 2015 **Best poster award**, Gordon Research Conference, The Amygdala in Health and Disease
- 2012 **Travel Fellowship**, Frontiers in Stress and Cognition
- 2012 **Best Poster Award**, Swiss Society for Neuroscience Annual Meeting

## PEER-REVIEWED PUBLICATIONS

**Google Scholar Citations: 5665 (3687 since 2019); h-index: 17**

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Publication impact: [Fadok citations](#)

- (1) Borkar CD, Fu X, Stelly CE, Dorofeikova M, Le QE, Vutukuri R, Vo C, Basavanhalli S, Duong A, Bean E, Resendez A, Parker JG, Tasker JG, **Fadok JP**. (2024) Top-down control of flight by a non-canonical cortico-amygdala pathway. *Nature*. 625: 743–749
- (2) Le QE, Hereford D, Borkar CD, Aldaco Z, Klar J, Resendez A, **Fadok JP**. (2023) Contributions of associative and non-associative learning to the dynamics of defensive ethograms. *eLife*. doi.org/10.7554/eLife.90414.1
- (3) Dorofeikova M, Stelly CE, Duong A, Basavanhalli S, Bean E, Weissmuller K, Sifnugel N, Resendez A, Corey DM, Tasker JG, **Fadok JP**. (2023) The role of genetically distinct central amygdala neurons in appetitive and aversive responding assayed

- with a novel dual valence operant conditioning paradigm. *eNeuro*. ENEURO.0319-22.2023.
- (4) Smith-Osborne L, Duong A, Resendez A, Palme R, **Fadok JP**. (2023) Female dominance hierarchies influence responses to psychosocial stressors. *Current Biology*. 33(8):1535-1549.e5.
  - (5) Dorofeikova M, Borkar CD, Weissmuller K, Smith-Osborne L, Basavanhalli S, Bean E, Duong A, Resendez A, **Fadok JP**. (2023) Effects of footshock stress on social behavior and neuronal activation in the medial prefrontal cortex and amygdala of male and female mice. *PLoS One*. 18(2):e0281388.
  - (6) Fu X, Teboul E, Weiss GL, Antonoudiou P, Borkar CD, **Fadok JP**, Maguire J, Tasker JG. (2022) Gq activation in BLA parvalbumin interneurons induces burst firing and mediates fear-associated network and behavioral state transition in mice. *Nature Communications*. 13(1):1290.
  - (7) Puccetti NA, Villano WJ, **Fadok JP**, Heller AS. (2021) Temporal dynamics of affect in the brain: Evidence from human imaging and animal models. *Neuroscience and Biobehavioral Reviews*. 133: 104491.
  - (8) Whittle N, **Fadok JP**, MacPherson KP, Botta P, Wolff SBE, Müller C, Herry C, Tovote P, Holmes A, Singewald N, Lüthi A, Ciochi S. (2021) Central amygdala micro-circuits mediate fear extinction. *Nature Communications*. 12(1): 4156.
  - (9) Borkar CD, **Fadok JP**. (2021) A novel Pavlovian fear conditioning paradigm to study freezing and flight behavior. *Journal of Visualized Experiments*. 167: e61536.
  - (10) Borkar CD, Dorofeikova M, Le QE, Vutukuri R, Vo C, Hereford D, Resendez A, Basavanhalli S, Sifnugel N, **Fadok JP**. (2020) Sex differences in behavioral responses during a conditioned flight paradigm. *Behavioural Brain Research*. 389: 112623.
  - (11) **Fadok JP**, Markovic M, Tovote P, Lüthi A. (2018) New perspectives on central amygdala function. *Current Opinion in Neurobiology*. 49: 141-147.
  - (12) **Fadok JP**, Krabbe S, Markovic M, Courtin J, Xu C, Massi L, Botta P, Bylund K, Müller C, Kovacevic A, Tovote P, Lüthi A. (2017) A competitive inhibitory circuit for selection of active and passive fear responses. *Nature*. 542(7639): 96-100.
  - (13) Karmakar K, Narita Y, **Fadok JP**, Ducret S, Loche A, Kitazawa T, Genoud C, Di Meglio T, Thierry R, Bacelo J, Lüthi A, Rijli FM. (2017) *Hox2* genes are required for tonotopic map precision and sound discrimination in the mouse auditory brainstem. *Cell Reports*. 18(1): 185-197.
  - (14) Xu C, Krabbe S, Botta P, **Fadok JP**, Gründemann J, Osakada F, Saur D, Grewe B, Schnitzer M, Callaway EM, Lüthi A. (2016) Distinct hippocampal pathways mediate dissociable roles of context in memory retrieval. *Cell*. 167(4): 961-972.

- (15) Tovote P, Esposito MS, Botta P, Chaudun F, **Fadok JP**, Markovic M, Wolff SB, Ramakrishnan C, Fenno L, Deisseroth K, Herry C, Arber S, Lüthi A. (2016) Midbrain circuits for defensive behavior. *Nature*. 534(7606): 206-12.
- (16) Tovote P\*, **Fadok JP\***, Lüthi A. (2015) Neuronal circuits for fear and anxiety. *Nature Reviews Neuroscience*. 16(6): 317-31. \*Equal contribution.
- (17) Botta P, Demmou L, Kasugai Y, Markovic M, Xu C, **Fadok JP**, Lu T, Poe MM, Xu L, Cook JM, Rudolph U, Sah P, Ferraguti F, Lüthi A. (2015) Regulating anxiety with extrasynaptic inhibition. *Nature Neuroscience*. 18(10): 1493-500.
- (18) Senn V, Wolff SBE, Herry C, Grenier F, Ehrlich I, Gründemann J, **Fadok JP**, Müller C, Letzkus JJ, Lüthi A. (2014) Long-range connectivity defines behavioral specificity of amygdala neurons. *Neuron*. 81(2): 428-437.
- (19) Zweifel LS\*, **Fadok JP\***, Argilli E, Garelick MG, Jones GL, Dickerson TM, Allen JM, Mizumori SJ, Bonci A, Palmiter RD. (2011) Activation of dopamine neurons is critical for aversive conditioning and prevention of generalized anxiety. *Nature Neuroscience*. 14(5): 620-6. \*Equal contribution.
- (20) Darvas M, **Fadok JP**, Palmiter RD. (2011) Requirement of dopamine signaling in the amygdala and striatum for learning and maintenance of a conditioned avoidance response. *Learning and Memory*. 18(3): 136-43.
- (21) Wall VZ, Parker JG, **Fadok JP**, Darvas M, Zweifel LS, Palmiter RD. (2011) A behavioral genetics approach to understanding D1 receptor involvement in phasic dopamine signaling. *Molecular and Cellular Neuroscience*. 46(1): 21-31.
- (22) **Fadok JP**, Darvas M, Dickerson TM, Palmiter RD. (2010) Long-term memory for Pavlovian fear conditioning requires dopamine in the nucleus accumbens and basolateral amygdala. *PLoS ONE*. 5(9): e12751.
- (23) **Fadok JP**, Dickerson TM, Palmiter RD. (2009) Dopamine is necessary for cue-dependent fear conditioning. *Journal of Neuroscience*. 29(36): 11089-11097.
- (24) Zweifel LS, Parker JG, Lobb CJ, Rainwater A, Wall VZ, **Fadok JP**, Darvas M, Kim MJ, Mizumori SJ, Paladini CA, Phillips PE, Palmiter RD. (2009) Disruption of NMDAR-dependent burst firing by dopamine neurons provides selective assessment of phasic dopamine-dependent behavior. *Proceedings of the National Academy of Sciences*. 106(18): 7281-88.

## COMMENTARIES

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- (1) Stelly CE, **Fadok JP**. (2021) Neurobiology: Novel peptide pathways impact threat discrimination. *Current Biology*. 31(19): R1117-R1119.

- (2) Borkar CD, **Fadok JP.** (2021) The hypothalamus coordinates diverse escape strategies from threat. *Neuron*. 109(11): 1763-1765.

## POPULAR MEDIA CONTRIBUTIONS

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- (1) **Fadok JP.** (2024) Taming the amygdala in PTSD. *Psychology Today*.  
<https://www.psychologytoday.com/intl/blog/cant-stress-this-enough/202403/taming-the-amygdala-in-ptsd>
- (2) **Fadok JP.** (2023) The brain-body connection in emotions. *Psychology Today*.  
<https://www.psychologytoday.com/intl/blog/cant-stress-this-enough/202311/the-brain-body-connection-in-emotions>

## CONFERENCE PROCEEDINGS - ORAL PRESENTATIONS

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- 2024 A novel cortico-amygdala pathway regulating defensive responses. Mini-symposium speaker, *Society for Neuroscience Annual Meeting*, Chicago, Illinois (to be presented in October)
- 2024 Top-down control of flight by a non-canonical cortico-amygdala pathway. *Frontal Cortex, Gordon Research Conference*, Holderness, New Hampshire (to be presented in August)
- 2020 Distributed circuits for the selection of defensive responses. *Winter Conference on Brain Research*, Big Sky, Montana
- 2019 Competitive inhibitory circuits for selection of active and passive fear responses. Minisymposium speaker, *Society for Neuroscience Annual Meeting*, Chicago, Illinois
- 2019 Neural circuit mechanisms controlling defensive responses. *Association for Psychological Science Annual Convention*, Washington, D.C.
- 2019 Defining the neural circuit mechanisms controlling passive and active defensive strategies. *Social and Affective Neuroscience Society Annual Meeting*, Miami, Florida
- 2018 The central amygdala mediates scalable defensive behaviors. 30<sup>th</sup> annual meeting of the *Winter Conference on Neural Plasticity*, Willemstad, Curacao
- 2016 A competitive inhibitory circuit for selection of active and passive fear responses, *Inner Workings of a Molecular Brain* conference, Santorini, Greece
- 2016 A competitive inhibitory circuit for selection of active and passive fear responses, *Cellular and Molecular Neurobiology of Mental Disease* conference, Giessbach, Switzerland

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**CONFERENCE PROCEEDINGS - POSTER PRESENTATIONS**

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- 2023 Defining the Function of the Cholinergic Basal Forebrain during Acquisition of Complex Threat Associations. *American College of Neuropsychopharmacology Annual Meeting*, Tampa, Florida
- 2022 Interoceptive regulation of trauma-induced hyperarousal. *American College of Neuropsychopharmacology Annual Meeting*, Phoenix, Arizona
- 2022 Dynamics of defensive behavior using Pavlovian fear conditioning with a serial compound stimulus. *Pavlovian Society Annual Meeting*, Milwaukee, Wisconsin
- 2022 Direct prefrontal cortical projections to the central amygdala regulate high fear states in mice. *Frontal Cortex, Gordon Research Conference*, Ventura, California
- 2021 Direct prefrontal cortical projections to the central amygdala regulate high fear states in mice. *American College of Neuropsychopharmacology Annual Meeting*, San Juan, Puerto Rico
- 2021 Social dominance hierarchies negotiate the response to psychosocial stress in adult female mice. *American College of Neuropsychopharmacology Annual Meeting*, San Juan, Puerto Rico
- 2020 Prefrontal cortex projections to the central amygdala regulate defensive behavior. *American College of Neuropsychopharmacology Annual Meeting*, virtual meeting
- 2019 Sex differences in conditioned flight. *American College of Neuropsychopharmacology Annual Meeting*, Hollywood, Florida
- 2019 Sex dependent behavioral changes in a conditioned flight paradigm. *Amygdala Function in Emotion, Cognition and Disease*, Gordon Research Conference, Stonehill College, Easton, Massachusetts.
- 2018 Determining the role of the central amygdala in modulating complex fear states. *American College of Neuropsychopharmacology Annual Meeting*, Hollywood, Florida
- 2016 A competitive inhibitory circuit for selection of active and passive fear responses. *Society for Neuroscience Annual Meeting*, San Diego, California
- 2015 Central amygdala neurons gate expression of conditioned flight behavior. *The Amygdala in Health and Disease*, Gordon Research Conference, Stonehill College, Easton, Massachusetts.
- 2014 Central amygdala neurons gate expression of conditioned flight behavior. *Society for Neuroscience Annual Meeting*, Washington, D.C.
- 2014 CRF neurons in the central amygdala mediate conditioned active fear behavior. *Swiss Society for Neuroscience Annual Meeting*, Bern, Switzerland
- 2012 Amygdala circuits mediating the switch between active and passive fear responses. *Society for Neuroscience Annual Meeting*, New Orleans, Louisiana
- 2012 Amygdala circuits mediating the switch between active and passive fear



- responses. *Frontiers in Stress and Cognition* conference, Ascona, Switzerland
- 2012 Neuronal circuitry underlying multiple valence learning. *NCCR Synapsy Annual Meeting*, Villars, Switzerland
- 2012 Determining the function of amygdala projections to the basal forebrain. *Swiss Society for Neuroscience Annual Meeting*, Zurich, Switzerland.
- 2009 An essential role for dopamine in fear conditioning. *42<sup>ND</sup> Annual Winter Conference on Brain Research*, Copper Mountain, Colorado
- 2008 An essential role for dopamine in fear conditioning. *Howard Hughes Medical Institute Meeting on Neural Circuits*, Ashburn, Virginia
- 2004 Effects of intraspinal stimulation in C6-T1 and C3-C4 segments on arm muscle activity (EMG) in behaving monkeys. *Society for Neuroscience Annual Meeting*, San Diego, California

#### CONFERENCE PROCEEDINGS - MENTORED POSTER PRESENTATIONS

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- 2024 Friedman C, Borkar C, Stelly C, **Fadok JP**. The role of the central amygdala in defensive response regulation in mice. 13th Annual National Collegiate Research Conference, Harvard University, Cambridge, Massachusetts.
- 2023 Friedman C, Borkar C, Stelly C, **Fadok JP**. The role of the central amygdala in defensive response regulation in mice. *12th Naval Academy Science and Engineering Conference*, Annapolis, Maryland
- 2023 Borkar CD, Stelly CE, Le QE, Friedman C, **Fadok JP**. Role of divergent central amygdala projections in defensive response regulation in mice. *Society for Neuroscience Annual Meeting*, Washington, D.C.
- 2023 Le QE, Hereford D, Borkar CD, Alam T, Aldaco Z, Klar J, Evans K, Resendez A, **Fadok JP**. Investigating contributions of the central amygdala to dynamic defensive behaviors during fear extinction. *Pavlovian Society Annual Meeting*, Austin, Texas
- 2023 Anderson KJ, Stelly CE, Stolin P, Brown O, **Fadok JP**. Unit activity in the amygdalostratial region and central nucleus of the amygdala during cue-evoked suppression of reward seeking. *Amygdala Function in Emotion, Cognition and Disease*, Gordon Research Conference, Castelldefels, Spain
- 2022 Stelly CE, Hall AM, Anderson KJ, Duong AP, Azadi N, **Fadok JP**, Tasker JG. Traumatic stress models of fear incubation and hyperarousal. *Neurobiology of Stress Workshop*, Columbia, SC
- 2022 Borkar CD, Fu X, Stelly CE, Dorofeikova M, Le QE, Vutukuri V, Vo C, Basavanhalli S, Duong A, Bean E, Resendez A, Parker JG, Tasker JG, **Fadok JP**. Prefrontal Cortical Projections to the Central Amygdala Mediates Panic-Like States in Mice. *Society of Biological Psychiatry Annual Meeting*, New Orleans, Louisiana

- 2022 Anderson KJ, Stelly CE, **Fadok JP**. Central amygdala neuronal activity during cue-evoked suppression of reward seeking. *Diversity poster session, Society for Neuroscience Annual Meeting*, San Diego, California
- 2022 Hereford D, Le QE, Resendez A, **Fadok JP**. Inhibition of Cholinergic Basal Forebrain Neurons Disrupts Salience Detection and Subsequent Defensive Action Selection. *Society for Neuroscience Annual Meeting*, San Diego, California
- 2022 Le QE, Hereford D, Klar J, Goodman A, Vutukuri R, Borkar CD, Resendez A, **Fadok JP**. Investigation of diverse context-specific behavioral responses during fear extinction. *Society for Neuroscience Annual Meeting*, San Diego, California
- 2022 Smith-Osborne L, Duong A, **Fadok JP**. Social hierarchies negotiate the response to psychosocial stress in an adult female mouse model of depression. *Winter Conference on Brain Research*, Snowmass, Colorado
- 2021 Borkar CD, Fu X, Le QE, Vutukuri R, Vo C, Resendez A, Tasker J, **Fadok JP**. Role of direct prefrontal cortical projections to the central amygdala in mediation of high fear states. *Society for Neuroscience Annual Meeting (virtual)*
- 2021 Stelly CE, Hall AM, Anderson KJ, **Fadok JP**, Tasker JG. Traumatic stress models for fear incubation and hyperarousal. *Society for Neuroscience Annual Meeting (virtual)*
- 2020 Borkar CD, Fu X, Le QE, Vutukuri R, Vo C, Resendez A, Tasker J, **Fadok JP**. Role of Prefrontal Cortex Afferents to the Amygdala in Regulation of Defensive Behavior. *SfN Global Connectome (virtual)*

## INVITED TALKS

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- 2024 Top-down cortical control over defensive responses via distributed pathways, *Hotchkiss Brain Institute*, University of Calgary. (to be presented October 25).
- 2024 A novel cortico-amygdala pathway regulating defensive responses, *Departments of Neuroscience and Psychological Sciences*, Loyola University of New Orleans
- 2024 Female rank influences responses to psychosocial stress, *Tulane Center of Excellence in Sex-Based Biology and Medicine Symposium*, Tulane University
- 2024 A novel cortico-amygdala pathway regulating defensive responses, *Department of Cell Biology and Anatomy*, LSU Health Sciences Center
- 2024 A novel cortico-amygdala pathway regulating defensive responses, *Tulane Brain Institute Seminar Series*, Tulane University
- 2023 A novel cortico-amygdala pathway regulating defensive responses, *Department of Neuroscience*, Northwestern University
- 2019 Central amygdala circuits mediate the selection of adaptive behavior. *Department of Psychology*, University of California, Davis
- 2018 Elucidating the neuronal mechanisms that modulate fear intensity. *Center for Molecular and Behavioral Neuroscience*, Rutgers University, New Brunswick,

New Jersey

- 2018 Neuronal mechanisms controlling fear scalability. *Alcohol and Drug Abuse Center of Excellence 9<sup>th</sup> Scientific Retreat*, LSU School of Medicine, New Orleans, Louisiana
- 2017 Dissecting the neuronal circuits of defensive behavior. *Department of Cell Biology and Anatomy*, Louisiana State University Health Science Center, New Orleans, Louisiana
- 2017 Dissecting the neuronal circuits of defensive behavior. *Neurocentre Magendie*, INSERM, Bordeaux, France
- 2017 Dissecting the neuronal circuits of defensive behavior. *Center for Neural Science*, New York University, New York, New York
- 2017 Dissecting the neuronal circuits of defensive behavior. *Department of Psychological and Brain Sciences*, Boston University, Boston, Massachusetts
- 2017 Dissecting the neuronal circuits of defensive behavior. *Department of Psychology*, University of Maryland, College Park, Maryland
- 2017 Dissecting the neuronal circuits of defensive behavior. *Tulane Brain Institute*, Tulane University, New Orleans, Louisiana
- 2013 The role of CEI CRF neurons in active fear responding, *Department of Biochemistry*, University of Washington, Seattle, Washington
- 2011 Determining the Function of Amygdala Projections to the Basal Forebrain, *University College London*, London, England
- 2009 Dopamine is necessary for cue-dependent fear conditioning, *Neurobiology and Behavior Program Retreat*, University of Washington, Seattle, Washington

## **TEACHING EXPERIENCE**

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### **Tulane University:**

#### Instructor of record (Undergraduate):

*Brain and Behavior* (Fall 2017, 2018, 2019, 2021, 2022, 2023)

*Honors Brain and Behavior* (Spring 2019, 2020, 2022)

#### Instructor of record (Graduate):

*Neurobiology of Emotion* (Spring 2021)

*Conveying Neuroscience Research* (Spring 2023, 2024)

#### Guest lecturer (Graduate):

*Graduate Neuroscience I* (Fall 2020)

Instructor of record: Dr. Jeffrey Tasker

*Graduate Neuroscience II* (Spring 2018, 2019, 2023, 2024)

Instructor of record: Dr. Sara Clark

**University of Washington:**

Graduate Teaching Assistant:

*Introduction to Systems Neurobiology* (Spring 2007)

Instructor of record: Dr. Michael Kennedy

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**RESEARCH MENTORING**

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**Postdoctoral Fellows**

- 2018-pres **Chandrashekar Borkar, PhD** (Nagpur University, India). Currently a Research Scientist I. *Recipient of the Society for Neuroscience Trainee Professional Development Award (2021; 2023)*
- 2020-2023 **Claire Stelly, PhD** (University of Texas, Austin). *Currently a tenure-track assistant professor, Department of Psychology, Loyola University.*
- 2018-2021 **Maria Dorofeikova, MD, PhD** (Saint Petersburg State University, Russia). *Currently a Research Scientist at the Max Delbrück Center, Berlin, Germany*

**Graduate students (PhD)**

- 2024-pres **Luisa Zavala Rodriguez**, PhD Program in Neuroscience
- 2021-pres **Kasey Anderson**, PhD Program in Neuroscience
- 2019-pres **Quan-Son Eric Le, MS**, PhD Program in Neuroscience
- 2019-pres **Daniel Hereford**, PhD Program in Neuroscience
- 2019-2022 **Lydia Smith-Osborne, DVM**, TNPRC T32 NRSA Ph.D. Training Program. Dissertation: “Female dominance hierarchies influence responses to psychosocial stressors”. *Currently a Companion Animal Clinical Development Clinician-Manager for Zoetis.*

**Graduate students (master’s)**

- 2022-2023 **Alyssa Hall**, 4+1 Master’s Program in Neuroscience. Thesis: “Analysis of cFos expression and microglial branch density in a mouse model of trauma-induced hyperarousal”. *Currently a research associate at the Stanley Center of the Broad Institute (MIT).*
- 2020-2021 **Kate Weissmuller**, 4+1 Master’s Program in Neuroscience. Thesis: “The influence of corticotropin-releasing hormone-expressing neurons located in the central nucleus of the amygdala on social interaction in C57Bl/6J mice”. *Currently attending Tulane Medical School, M2.*

**Undergraduate Honors Theses**

2020-2022 **Anh Duong**, Neuroscience, Thesis: “Social status mediates isolation stress response and mood-related symptoms in female mice”. *Recipient of the Arnold Gerall Prize for Neuroscience, 2022. Currently attending University of Southern California School of Pharmacy (PharmD), P2.*

**Undergraduate and master’s degree research assistants (7 current)**

Sarah Neuberger (2022- ), JP Ott (2023- ), Owen Brown (2023- ), Chloe Friedman (2023- ), Lexi Walden (2024- ), Lulu Sawaf (2024- ), Yumnah Siddiqui (2024- )

**Undergraduate and master’s degree research assistants (20 past)**

Natalia Sifnugel (2018-2020); Tal Sherman (2018-2021), Danielle Statman (2018), Rithvik Vutukuri (2018-2022), Samhita Basavanhalli (2019-2021), Erin Bean (2019-2021), Amanda Ringland (2019-2020), Catherine Vo (2019-2022), Camilla Schreiber (2019-2022), Catharina Westergaard (2020-2021), Avery Smith (2020-2022), Harrison Blefeld (2020-2023), Adam Goodman (2021-2022), Naseem Azadi (2021-2023), Alex Walker (2022-2023)--*Recipient of the Arnold Gerall Prize for Neuroscience, 2022*, Zach Aldaco—*LS-LAMP Program* (2022-2023), Julia Klar (2021-2024), Paul Stolin (2022-2024), Thamid Alam (2022-2024), Delia O’Brien (2022-2024),

**GRADUATE/UNDERGRADUATE STUDENT RESEARCH SUPPORT  
(>\$74,000 total)**

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**Irene & Eric Simon (IES) Brain Research Foundation Summer Fellowship**

Natalia Sifnugel, \$2500, 2019

**Center for Academic Equity Research Grant**

Samhita Basavanhalli, \$2000, 2020  
Naseem Azadi, \$3000, 2021; \$1476, 2022  
Owen Brown, \$1110, 2023  
Paul Stolin, \$780, 2023  
Chloe Friedman, \$1500, 2024

**Newcomb College Institute Summer Grant**

Erin Bean, \$1000, 2019  
Anh Duong, \$1000, 2020

**Newcomb-Tulane College**

Rithvik Vutukuri, 2019 (Dean’s grant)  
Erin Bean, \$1000, 2019 (Research grant)  
Samhita Basavanhalli, \$1000, 2020 (Research grant)  
Anh Duong, \$2000, 2020 (Research grant—winter and summer)  
Alyssa Hall, \$3000, 2021 (Summer Research Immersion Fund)  
Avery Smith, \$500, 2021 (Ching Grant)

Julia Klar, \$3500, 2022 (Summer Research Program)  
Owen Brown, \$890, 2023 (Office of Academic Enrichment)  
JP Ott, \$3000, 2023 (Summer Research Program)  
Paul Stolin, \$2500, 2023 (Summer Research Program and Office of Academic Enrichment)  
Chloe Friedman, \$4750, 2024 (Summer Research Program and Office of Academic Enrichment)

**Tulane Center for Engaged Learning and Teaching (CELT)**

Rithvik Vutukuri, \$3100, 2019  
Alyssa Hall, \$1400, 2021  
Avery Smith, \$1500, 2021  
Naseem Azadi, \$1300, 2022  
Julia Klar, \$1000, 2022  
Owen Brown, \$1500, 2023  
JP Ott, \$1500, 2023  
Paul Stolin, \$1500, 2023

**Tulane Honor's Program undergraduate summer research award**

Rithvik Vutukuri, 2020

**Tulane Undergraduate Research in Neuroscience award (TURN)**

Natalia Sifnugel, \$3000, 2018  
Katherine Weissmuller, \$3000, 2019  
Anh Duong, \$3000, 2021; also received the McQuillen Family Endowed Research Fund, \$1000  
Alyssa Hall, \$3500, 2022  
Alex Walker, \$3500, 2022  
Thamid Alam, \$4000, 2023  
JP Ott, \$4000, 2024  
Owen Brown, \$4000, 2024

**MENTORED RESEARCH PRESENTATIONS (TULANE INTRAMURAL)**

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- 2024 Friedman C, Borkar C, Stelly C, **Fadok JP**. The role of the central amygdala in defensive response regulation in mice. *CELT poster session*
- 2024 Ott JP, Hereford D, Le QE, Evans K, **Fadok JP**. Machine learning data analysis validation and the effect of threat saliency on acetylcholine release in the BLA, *CELT poster session*
- 2024 Alam T, Le QE, Evans K, **Fadok JP**. Investigating central amygdala dependent dynamics in fear extinction. *Tulane Research, Innovation, and Creativity Summit (TRICS) poster session*
- 2024 Stolin P, Brown O, Stelly C, Evans K, **Fadok JP**. NTS noradrenergic signaling

- and its influence on hyperarousal. *Tulane Research, Innovation, and Creativity Summit (TRICS) poster session*
- 2024 Brown O, Stolin P, Hall A, Stelly C, Evans K, **Fadok JP**. Differences in noradrenergic activation of DBH-Cre mice in a mouse model of trauma-induced hyperarousal. *Tulane Research, Innovation, and Creativity Summit (TRICS) poster session*
- 2023 Ott JP, Hereford D, Le QE, Evans K, **Fadok JP**. Machine learning data analysis validation and the effect of threat saliency on acetylcholine release in the BLA. *NTC Research Symposium*
- 2023 Alam T, Le QE, Evans K, **Fadok JP**. Investigation of central amygdala-dependent dynamics in fear extinction. *Tulane Undergraduate Research in Neuroscience Poster Session*
- 2023 Klar J, Le QE, Borkar CD, **Fadok JP**. Quantification of CRH and SOM neuronal projections from the central nucleus of the amygdala. *CELT poster session*
- 2023 Azadi N, Stelly CE, Hall AM, Anderson KJ, **Fadok JP**, Tasker JG. How interoceptive input affects freezing behavior triggered by a looming stimulus. *CELT poster session*
- 2023 Le QE, Hereford D, Aldaco Z, Klar J, Goodman A, Borkar CD, Resendez A, **Fadok JP**. Investigating central amygdala-dependent dynamics in defensive behavior selection during fear extinction. *Tulane Research, Innovation, and Creativity Summit (TRICS) poster session*
- 2023 Hall AM, Stelly CE, Anderson KJ, **Fadok JP**. Analysis of adrenergic and inflammatory markers in a mouse model of trauma-induced hyperarousal. *Tulane Research, Innovation, and Creativity Summit (TRICS) poster session*
- 2023 Le QE, Hereford D, Klar J, Goodman A, Vutukuri R, Borkar CD, Resendez A, **Fadok JP**. Investigation of diverse context-specific behavioral responses during fear extinction. *Greater New Orleans Society for Neuroscience Meeting*
- 2022 Hereford D, Le QE, Resendez A, **Fadok JP**. Inhibition of Cholinergic Basal Forebrain Neurons Disrupts Saliency Detection and Subsequent Defensive Action Selection. *Greater New Orleans Society for Neuroscience Meeting*
- 2022 Hall A, Stelly CE, Anderson KJ, Azadi N, Duong A, **Fadok JP**. The role of the NTS in mediating symptoms of post-traumatic stress disorder. *Tulane Undergraduate Research in Neuroscience Poster Session*
- 2022 Walker A, Borkar CD, **Fadok JP**. Neuroanatomical characterization of the CeA-to-RRF pathway. *Tulane Undergraduate Research in Neuroscience Poster Session*
- 2022 Hall A, Stelly CE, Anderson KJ, Duong A, **Fadok JP**. Modeling hyperarousal in mice with repeated reminders of traumatic experience. *CELT poster session*
- 2022 Smith A, Borkar CD, **Fadok JP**. Determining the role of central amygdala collaterals on the periaqueductal gray and lateral hypothalamus in mouse models. *CELT poster session*

- 2022 Smith-Osborne L, Duong A, **Fadok JP**. Social hierarchies negotiate the response to psychosocial stress in an adult female mouse model of depression. *Tulane Heath Science Research Days*.
- 2022 Hereford D, Le QE, Resendez A, Corey D, **Fadok JP**. Chemogenetic Inhibition of Cholinergic Basal Forebrain Neurons Disrupts Salience Detection in Serial Compound Stimulus Fear Conditioning. *Tulane Heath Science Research Days*.
- 2022 Le QE, Goodman A, Vutukuri R, Borkar CD, Hereford D, Resendez A, **Fadok JP**. Investigation of Diverse Behavioral Responses During Fear Extinction. *Tulane Heath Science Research Days*.
- 2021 Duong A, Smith-Osborne L, Westergaard C, Fadok JP. Social status mediates isolation stress response in female mice. *Tulane Undergraduate Research in Neuroscience Poster Session*
- 2020 Vutukuri R, Borkar CD, Le QE, **Fadok JP**. Determining the role of dorsal peduncular cortex neuronal afferents to the amygdala in regulating fear intensity in mice. *CELT poster session*
- 2019 Weissmuller K, Dorofeikova M, Resendez A, **Fadok JP**. Neuronal Circuit Mechanisms Underlying Cognitive Changes in Models of Brain Disorders. *Tulane Undergraduate Research in Neuroscience Poster Session*
- 2019 Borkar C, Dorofeikova M, Martin R, Sifnugel N, Vutukuri R, Resendez A, **Fadok JP**. Defining the neural circuit mechanisms underlying switches from passive to active fear behavior. *Tulane Heath Science Research Day*
- 2018 Martin R, Borkar C, Dorofeikova M, Sifnugel N, Le QE, Resendez A, **Fadok JP**. Recording the neural correlates of fear and anxiety using deep-brain calcium imaging. *Greater New Orleans Society for Neuroscience Meeting*
- 2018 Sifnugel N, Dorofeikova M, Resendez A, **Fadok JP**. Quantifying GABAergic, Glutamatergic, and Cholinergic Neurons in the Substantia Innominata. *Tulane Undergraduate Research in Neuroscience Poster Session*

**DOCTORAL STUDENTS (COMMITTEE MEMBER)**

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Jill King (2018-2021; Markant), Neuroscience; Brianna Hunter (née Keenan) (2018-2022; Markant), Psychology; Michael Langhardt (2018; Mostany), Neuroscience; Alexis Ducote (2019-2021; Mostany), Neuroscience; Taylor Templeton (2019-2022; Gilpin), Physiology, LSU School of Medicine; Youad Darwish (2020-present; Huang), Cellular and Molecular Biology; Nathan Sharfman (2020-2022; Gilpin), Physiology, LSU School of Medicine; Xiao Han (2020-2021; Galazo), Neuroscience; Cemaliye Semmedi (2021-present; Mostany), Neuroscience; Matthew Watson (2021-present; Tasker), Neuroscience; Parker Tirrell (2022-present; Tasker), Neuroscience; Taylor Marcus (2022-present; Markant), Neuroscience



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**SERVICE TO PROFESSION**


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- 2024      **Chair and panel organizer**, Society for Neuroscience Annual Meeting Minisymposium: Control of Adaptive Behavior by Neuronal Circuits in the Central Nucleus of the Amygdala
- 2024-pres      **Ad hoc grant reviewer**, French National Research Agency (ANR)
- 2023-pres      **Ad hoc grant reviewer**, National Science Centre, Poland (NCN)
- 2021-2022      **Member, Fellowships: Behavioral Neuroscience**, Center for Scientific Review, National Institutes of Health (202110 ZRG1 F02A K20; 202205 ZRG1 F02A K20; 202210 ZRG1 F02A K20)
- 2020-pres      **Ad hoc grant reviewer**, Swiss National Science Foundation (SNF)
- 2019-2021      **Organizing committee member**, D'Angelo Workshop on Co-morbid Mental Health Disorders
- 2018      **Co-chair**, Society for Neuroscience Annual Meeting Nanosymposium: Cortical and Subcortical Mechanisms of Learning and Cognition
- 2018-pres      **Ad hoc grant reviewer**, German Research Foundation (DFG)

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**AD HOC JOURNAL REVIEW (69 papers reviewed since 2017)**


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Annals of the New York Academy of Sciences, Behavioural Brain Research, Biological Psychiatry, Cell Reports, Current Biology, Current Opinion in Behavioral Sciences, eLife, eNeuro, European Journal of Neuroscience, Frontiers in Behavioral Neuroscience, Journal of Clinical Investigation, JoVE, Learning and Memory, Molecular Psychiatry, Nature, Nature Communications, Nature Neuroscience, Neurobiology of Learning and Memory, Neurobiology of Stress, Neuron, Neuropsychopharmacology, Neuroscience & Biobehavioral Reviews, Physiology and Behavior, Psychopharmacology, Science Advances, Scientific Reports, Translational Psychiatry, Trends in Cognitive Sciences

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**UNIVERSITY SERVICE**


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- 2021-pres      **Member, Nominating Committee**, School of Science and Engineering

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**DEPARTMENTAL SERVICE**


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- 2023-pres      **Member, Flowerree committee**, Department of Psychology
- 2023-pres      **Member, Developmental Psychology Faculty Search Committee**, Department of Psychology
- 2022-2023      **Member, EDI committee**, Department of Psychology

2021-2022 **Member**, *Cognitive Neuroscience Faculty Search Committee*,  
Department of Psychology  
2019-2020 **Member**, *PhD Admissions Committee*, Department of Psychology  
2018-2022 **Member**, *Presidential Chair Search Committee*, Tulane Brain Institute  
2018-pres **Member**, *Graduate Training Committee*, Department of Psychology  
2017-2018 **Member**, *Colloquium Committee*, Department of Psychology  
2017-pres **Advisor**, *psychology majors*, Department of Psychology

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## **OTHER SERVICE AND OUTREACH**

2024 **Volunteer**, *Brain Awareness Table*, New Orleans Book Festival  
2024 **Speaker**, *Top Scholars Weekend*, Tulane University  
2024 **Faculty member**, *4.0 Dinner*, Newcomb-Tulane College  
2020-pres **Faculty leader**, *Gray Matter Scholar Society*, Newcomb-Tulane College

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## **PROFESSIONAL MEMBERSHIPS**

Society for Neuroscience, 2012-present  
Social and Affective Neuroscience Society, 2019-2020  
Pavlovian Society, 2020-present  
American College of Neuropsychopharmacology, 2021-present  
Society of Biological Psychiatry, 2022-present

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## **MEDIA COVERAGE**

February 22, 2024 <https://news.feinberg.northwestern.edu/2024/02/22/novel-pathway-explains-the-escalation-of-fear-responses/>

January 17, 2024 <https://news.tulane.edu/pr/researchers-discover-brain-pathway-regulates-fear-responses>

March 30, 2023 <https://sse.tulane.edu/content/study-examines-how-social-rank-affects-response-stress>

August 3, 2020 <https://news.tulane.edu/pr/tulane-study-seeks-new-insights-panic-disorder-and-post-traumatic-stress-disorder>