BIOGRAPHICAL SKETCH

Calipari, Erin S.

eRA COMMONS USER NAME: ECALIPARI

POSITION TITLE:
Assistant Professor

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	COMPLETION	FIELD OF STUDY
University of Massachusetts, Amherst, MA	BS	05/2009	Biology, Psychology
Wake Forest University, Winston-Salem, NC	PhD	12/2013	Pharmacology/Neuroscience
Icahn School of Medicine at Mount Sinai, New York, NY	Post-Doc	11/2016	Neuroscience/Genetics

A. Personal Statement

My research program is guided by two overarching questions:

1. ***How do neural circuits integrate experiences with positive and negative stimuli to guide future behavior?***
2. ***How is information stored and maintained within specific circuits on a molecular level?***

One of the most fundamental forms of learning is the ability to associate positive and negative stimuli with cues that predict their occurrence. The ability to seek out rewarding stimuli and avoid negative stimuli is critical to survival and is evolutionarily conserved across species. Organisms achieve this by assigning value to cues that predict these stimuli; however, dysregulation of these processes can precipitate a number of psychiatric disease states, including anxiety, depression, substance use disorder, among others. Learning about environmental stimuli is a complex process controlled by a computational network of neural connections interacting with transcriptional and molecular mechanisms within each cell to precisely guide neuronal activity and behavior. The interplay between rapid, temporally specific neuronal activation and longer-term changes in transcription is of critical importance in the expression of appropriate or, in the case of disease, inappropriate behaviors. ***Together, my research seeks to understand how information is encoded in the brain. By integrating technologies that allow us to approach this question from the behavioral, circuit, local microcircuit, and molecular level we focus on understanding how adaptive and maladaptive processes in reward, motivation, and associative learning are regulated and dysregulated in disease.***

Ongoing and recently completed projects that I would like to highlight include:

Current

07/01/19-05/30-2024
DP1 DA048931; National Institute on Drug Abuse
Role: PI
Making and breaking opioid memories to prevent relapse

09/22/2021-7/31/2026
R01 DA052317; National Institute on Drug Abuse
Role: PI
Mechanisms of dopaminergic dysfunction in substance use disorder

09/01/21 – 07/31/26
R01 DA042475; National Institute on Drug Abuse
Role: Co-I
Noradrenergic Regulation in the BNST

08/01/21 – 05/31/26
R01DA052460; National Institute on Drug Abuse

Role: Co-I
Circadian Rhythms and Cocaine Use Disorder

09/15/21 – 5/31/26
R01DA040630; National Institute on Drug Abuse
Role: Co-I
Parvalbumin interneurons regulate nucleus accumbens synapses and behavior

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

2022-present **Associate Director,** Vanderbilt Center for Addiction Research
2022 **President,** Behavioral Pharmacology Society
2021-present **Standing Study Section Member,** Molecular and Cellular Neuropharmacology
2020-present **Associate Editor**, Journal of Neuroscience
2019 **Associate Member**, American College for Neuropsychopharmacology
2018-present **Editorial Board**, Neuropsychopharmacology
2017-present **Assistant Professor**, Department of Pharmacology, Vanderbilt Center for Addiction Research, Vanderbilt University, Nashville, TN
2016-2017 **Instructor**, Department of Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY
2015 **Associate Chair Elect**, Gordon Research Seminar on Catecholamines
2014-2016 **Postdoctoral Fellow**, Department of Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY
2009-2013 **Graduate Student**, Department of Pharmacology, Wake Forest University School of Medicine, Winston-Salem, NC
2006-2009 **Undergraduate Research Assistant**, Department of Psychology, University of Massachusetts, Amherst, MA

Honors

2022 **Mentor of the Year,** Vanderbilt University – Office of the Provost
External Advisory Committee, Center for Chronic Pain and Drug Abuse, Northwestern University
Chair, ACNP Publications Committee, American College of Neuropsychopharmacology
Dean's Faculty Fellow, Vanderbilt University
2021 **External Advisory Committee,** Center for Neural Circuits in Addiction, University of Minnesota
2021 Leading Research Advances, Brain and Behavior Research Foundation – Link
Co-Chair, ACNP Publications Committee, American College of Neuropsychopharmacology
Appointed as Standing Member to Molecular and Cellular Neuropharmacology (MCNP) Study Section, National Institutes of Health.
2020 **Early Career Investigator Award**, American Society for Pharmacology and Experimental Therapeutics
2019 **Daniel X. Freedman Prize Honorable Mention**, Brain and Behavior Research Foundation
DP1 Avenir Award in Genetics and Epigenetics, National Institute on Drug Abuse
2017 **SOBP Young Investigator Travel Award**, Society of Biological Psychiatry
Nancy Rutledge Zhaniser Award, American Society for Pharmacology and Experimental Therapeutics
Young Investigator Award, College on Problems of Drug Use and Dependence
2016 **Young Investigator Travel Award**, Winter Conference on Brain Research
BPS Postdoctoral Award, Behavioral Pharmacology Society
2015 **Irwin J. Kopin Traveling Fellowship**, Gordon Research Conference on Catecholamines
2014 **Gordon A. Melson Outstanding Doctoral Student Award**, Wake Forest University School of Medicine
2014 **ACNP Travel Award**, American College of Neuropsychopharmacology
2013 **NIDA Director's Award**, National Institute on Drug Abuse

2012 **Mary A. Bell Award,** Wake Forest School of Medicine
2012 **Irwin J. Kopin Fellowship for Excellence in Catecholamine Research**

Honors: Invited Talks (Selected from >100)

A novel framework for cell-type specific stimulus encoding in the nucleus accumbens. *Molecular and Cellular Cognition Society.* October 2019; Chicago, IL.

Sex differences in behavioral strategies: the role of the neural encoding of stimulus value. *Virginia Commonwealth University.* October 2019; Richmond, VA.

A novel framework for dopamine in learned behavior. *University of California, Los Angeles.* October 2019; Los Angeles, CA.

Dopaminergic mechanisms underlying sex differences in valence-based decision making. *Gordon Conference on Catecholamines.* August 2019; Newry, ME.

A balancing act: females prioritize avoiding aversive stimuli when making value-based decisions. Keynote for *Canadian College of Neuropsychopharmacology.* June 2019; Montreal, Québec, Canada.

The neural basis of sex differences in value-based decision making. *Canadian Neuroscience Meeting.* May 2019; Montreal, Québec, Canada.

Cell type specific activity signatures underlying sex differences in value-based decision making. *Washington University in St. Louis.* May 2019; St. Louis, MO.

C. Contributions to Science (selected from 85 publications; h-index = 36; i10-index: 61)

1. Sex differences in the trajectory and expression of substance use disorders. One of the core focuses of the work in my laboratory is understanding sex as a critical biological variable in disease – especially substance use disorders. This work has outlined baseline sex differences in motivation and defined how these interact with drug-associated stimuli to drive the expression and trajectory of substance use disorders (including alcohol use disorder).

a. Kutlu MG#, Zachry JE#, Brady LJ, Melugin P, Sanders C, Tat J, Johnson AR, Thibeault KC, Lopez AJ, Siciliano CA, **Calipari ES** (2020) A novel multidimensional reinforcement task in mice elucidates sex-specific behavioral strategies. Neuropsychopharmacology. 45(9):1463-1472. [PMID: 32375157] [PMCID: 7360782]
b. Johnson AR, Thibeault KC, Loez AJ, Peck EG, Sands LP, Kutlu MG, **Calipari ES** (2019) Cues play a critical role in estrous-cycle dependent enhancement of cocaine reinforcement. Neuropsychopharmacology. 44(7):1189-1197. [PMID: 30728447] [PMCID: 6785030]
c. Zachry JE, Johnson AR, **Calipari ES**. (2019) Sex differences in value-based decision making underlie substance use disorders in females. Alcohol and Alcoholism. 54(4):339-341. [PMID: 31220203] [PMCID: 6671483]
d. Kiraly DD, Walker DM, **Calipari ES** (2018) Modeling drug addiction in females: how internal state and environmental context facilitate vulnerability. Current Opinions in Behavioral Sciences. 23: 27-35. [PMCID: In Process]

2. Elucidating neural mechanisms of associative learning & dysregulation by substance use disorder Learned associations between environmental cues and experience are the basis of decision-making and allow organisms to guide behavior towards advantageous outcomes. Animals achieve this by assigning value to cues that predict positive and negative stimuli, termed valence. Here we have outlined how multiple circuits in reward-related brain regions converge to encode this information and how drugs of abuse dysregulate these circuits to drive drug seeking.

a. Kutlu MG, Zachry JE, Melugin PR, Cajigas S, Isiktas A, Siciliano CA, Schoenbaum G, Sharpe MJ, **Calipari ES** (2022). Dopamine signaling in the nucleus accumbens core mediates latent inhibition. *Nature Neuroscience.* In press.
b. **Calipari ES**, Bagot RC, Purushothaman I, Walker DM, et al. In vivo imaging identifies temporal signature of D1 and D2 medium spiny neurons in cocaine reward. *Proc Natl Acad Sci USA*. 2016 Mar 8; 113(10):2726-31. [PMID: 26831103] [PMCID: 4791010]
c. **Calipari ES**, Juarez B, Morel C, Walker DM, Cahill ME, Riberio E, Deisseroth K, Han MH, Nestler EJ. Dopaminergic dynamics underlying sex-specific cocaine reward. *Nat Commun*. 2017 Jan 10; 8:13877. [PMID: 28072417] [PMCID: 5234081]

d. Kutlu MG, Zachry JE, Melugin P, Kutlu B, Cajigas SA, Thibeault KC, Tian L, Siciliano CA, **Calipari ES**. (2021) Dopamine in the nucleus accumbens core signals perceived saliency. *Current Biology. S0960-9822(21)01188-X*. [PMID: 34529938] [PMCID: In Process]

****Highlighted as Exceptional on Faculty Opinions (formerly F1000).** Dalley J: Faculty Opinions Recommendation of [Kutlu MG et al., Curr Biol 2021]. In Faculty Opinions, 14 Oct 2021; 10.3410/f.740812110.793588838

3. Crosstalk between the epigenome and neural circuits controlling complex behaviors

Learning about drug rewards and predictive cues is a complex process controlled by a computational network of neural connections interacting with transcriptional and molecular mechanisms within each cell to precisely guide behavior. The interplay between rapid, temporally specific neuronal activation, and longer-term changes in transcription is of critical importance in the expression of appropriate, or in the case of drug addiction, inappropriate behaviors. Understanding the complex interplay between epigenetic gene regulation and circuit connectivity will allow us to formulate novel therapies to normalize maladaptive reward behaviors, with a goal of modulating addictive behaviors, while leaving natural reward-associated behavior unaffected.

a. Mews P, **Calipari ES**. Crosstalk between the epigenome and neural circuits in drug addiction. *Prog Brain Res*. 2017; 235:19-63. [PMID: 29054289] [PMCID: 6339819]

b. Walker DM, Cates HM, Loh YE, Purushothaman I, et al. (***co-last, co-corresponding author**). Cocaine self-administration alters transcriptome-wide responses in the brain's reward circuitry. *Biol Psychiatry*. 2018 Dec 15; 84(12):867-80. [PMID: 29861096] [PMCID: 6202276]

c. Lopez AJ, Siciliano CA, **Calipari ES**. Activity-dependent epigenetic remodeling in addiction. *Handb Exp Pharmacol*. 2020; 258:231-63. [PMID: 31628597] [PMCID: Not Required, Book Chapter]

d. López AJ, Johnson AR, Euston TJ, Wilson R, Nolan SO, Brady LJ, Thibeault KC, Kelly SJ, Kondev V, Melugin P, Chuang E, Lam TT, Kiraly DD, **Calipari ES** (2021) Cocaine self-administration induces sex-dependent protein expression in the nucleus accumbens. *Communications Biology.* In Press. [PMID: 34272455] [PMCID: In progress]

4. The contribution of peripheral factors (immune and hormonal) to neural control of reward

Emerging data has highlighted the important role of peripheral factors in controlling reward behaviors as well as mood. These data establish a novel mechanism by which peripheral control of dopaminergic function by immune factors and hormones can change dopaminergic responses to cues and confer vulnerability to substance use disorder.

a. Kutlu MG, Brady LJ, Peck EG, Hofford RE, Yorgason JT, Sicilliano CA, Kiraly DD, **Calipari ES**. Granulocyte colony stimulating factor enhances reward learning through potentiation of mesolimbic dopamine system. *J Neurosci*. 2018 Oct 10; 38(41):8845-59. [PMID: 30150359] [PMCID: 6181308]

b. Johnson AR, Thibeault KC, Loez AJ, Peck EG, Sands LP, Kutlu MG, **Calipari ES**. Cues play a critical role in estrous-cycle dependent enhancement of cocaine reinforcement. *Neuropsychopharmacology.* 2019 Jun; 44(7):1189-97. [PMID: 30728447] [PMCID: 6785030]

c. Brady LJ, Hofford RS, Tat J, **Calipari ES**, Kiraly DD. Granulocyte-colony stimulating factor alters the pharmacodynamic properties of cocaine in female mice. *ACS Chem Neurosci*. 2019 Oct 16; 10(10):4213-20. [PMID: 31479229] [PMCID: 7328281]

d. Brady LJ, Erickson KR, Lucerne KE, Osman A, Kiraly DD, **Calipari ES**. (2021) Granulocyte-colony stimulating factor (G-CSF) enhances cocaine effects in the nucleus accumbens via a dopamine release-based mechanism. Psychopharmacology. In Press. [PMID: 34487190] [PMCID: In Process]

5. Defining the effects of alcohol exposure on limbic circuit control of behavior. Understanding how alcohol drinking alters brain circuits involved in reward and motivation is central to understanding its impact on behavior. This work, that goes back to my graduate training, focuses on defining how alcohol consumption and abstinence in rodents and primates alters striatal function. This work has outlined how microcircuit regulation of dopamine release in the striatum is altered by drinking in mice and non-human primates across a range of exposure paradigms.

a. Liu Y, Juarez B, Montgomery SE, Morel C, Zhang S, Kong Y, **Calipari ES**, Nestler EJ, Zhang L, Han MH (2020) Different Adaptations of Dopamine Release in Nucleus Accumbens Shell and Core of Individual Alcohol Drinking Groups of Mice. Neuropharmacology. 175:108176. [PMID: 32497591] [PMCID: 7492398]
b. Siciliano CA, **Calipari ES**, Cuzon Carlson VC, Helms CM, Lovinger DM, Grant KA, Jones SR. (2015) Voluntary Ethanol Intake Predicts Kappa Opioid Receptor Supersensitivity and Regionally Distinct Dopaminergic Adaptations in Macaques. Journal of Neuroscience. 35(15):5959-68. [PMID: 25878269] [PMCID: 4397597]
c. Siciliano CA, **Calipari ES**, Yorgason JT, Cuzon Carlson VC, Helms CM, Lovinger DM, Grant KA, Jones SR. Chronic ethanol self-administration in macaques shifts dopamine feedback inhibition to predominantly D2 receptors in nucleus accumbens core. (2015) Drug and Alcohol Dependence. 158:159-63. [PMID: 26627912] [PMCID: 4698076]
d. Siciliano CA, **Calipari ES**, Yorgason JT, Lovinger DM, Mateo Y, Jiminez VA, Grant KA, Jones SR. (2016) Increased presynaptic regulation of dopamine neurotransmission in the nucleus accumbens core following chronic ethanol self-administration in female macaques (2016). Psychopharmacology. 233(8):1435-43. [PMID: 26892380] [PMCID: 4814331]

Complete List of Published Work in MyBibliography: (85 publications; h-index: 36; i10-index: 61)
http://www.ncbi.nlm.nih.gov/sites/myncbi/erin.calipari.1/bibliography/44066461/public/