

Zachary T. Pennington, PhD

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Current Position

2023-present **Instructor, Icahn School of Medicine at Mount Sinai**
Laboratory of Dr. Denise Cai

Education & Training

2018-2022 **Icahn School of Medicine at Mount Sinai**
Postdoctoral Fellowship, Department of Neuroscience
Laboratory of Dr. Denise Cai

2018 **UCLA**
PhD, Behavioral Neuroscience and Quantitative Psychology
Advisor: Dr. Michael Fanselow

2010 **UCLA**
BA, Psychology
Advisor: Dr. J. David Jentsch

2008 **Pasadena City College**
AA, Psychology

Grants & Fellowships

Current Funding:

2023-2028 NIMH K99/R00 Pathway to Independence Award - \$999,000
“Disentangling the consequences of trauma”

2023-2025 Behavior & Brain Research Foundation, Young Investigator Award - \$70,000
Contributions of the anterior hypothalamic nucleus to post-trauma stress sensitization

Fellowships, Awards and Honors

2023-2028 NIMH K99/R00 Pathway to Independence Award

2023-2025 Behavior & Brain Research Foundation, Young Investigator Award

2022 McKnight Foundation Doupe Fellow

2022 Mount Sinai Neuroscience Outstanding Citizen Award

2018-2019 NIDA T32 Postdoc Fellowship: Sinai Interdisciplinary Training in Drug Abuse

2017-2018 UCLA Dissertation Year Fellowship

2017 UCLA Teaching Practicum Program Fellow

2016 UCLA Teaching Practicum Program Fellow

2015-2017	NIMH F31 Fellowship
2015	UCLA Brain Research Institute, Society for Neuroscience Travel Award
2012-2014	NIDA T32 Predoctoral Fellowship: UCLA Translational Neuroscience of Drug Abuse
2012	Travel Award to attend the BBC Translational Addiction conference
2012	UCLA Graduate Summer Research Mentorship Fellowship
2008	Opal Jones Trust Scholarship in Psychology. Pasadena City College
2008	Valedictorian of Pasadena City College

Diversity and Inclusion:

Being a high-school dropout and a community college graduate, I am where I am today because people saw my potential and mentored me. I am committed to extending the same caring hand to those from non-traditional and under-represented backgrounds. As a graduate student, I tutored homeless youth and served as a mentor for the UCLA Psychology Undergraduate Research Journal. As a postdoctoral fellow, I have helped acquire diversity supplements to support undergraduates from underrepresented backgrounds and have mentored these students in preparation for graduate school. As chair of the Neuroscience Postdoctoral Association, I co-led the development of a fellowship to bolster diversity within the Sinai Neuroscience Department, and am helping to develop youth outreach activities. Throughout my career, I hope to improve upward mobility at all stages of education and to promote an inclusive environment.

Publications:

Preprints:

Pennington ZT, LaBanca A, Sompolpong P, Christenson Wick Z, Feng Y, Dong Z, Francisco TR, Chen L, Fulton SL, Maze I, Shuman T, Cai DJ (2023). Dissociable contributions of the amygdala and ventral hippocampus to stress-induced changes in defensive behavior. *BioRxiv*, 2023.02.27.530077.
<https://doi.org/10.1101/2023.02.27.530077v2>

Zaki Y, **Pennington ZT**, Morales-Rodriguez D, Francisco TR, LaBanca AR, Dong Z, Carrillo Segura S, Silva AJ, Shuman T, Fenton A, Rajan K, Cai DJ (2023). Aversive experience drives offline ensemble reactivation to link memories across days. *BioRxiv*, 2023.03.13.532469.
<https://www.biorxiv.org/content/10.1101/2023.03.13.532469v1>

Research Reports:

Dong Z, Mau W, Feng Y, **Pennington ZT**, Chen L, Zaki Y, Rajan K, Shuman T, Aharoni D, Cai DJ (2022). Minian, an open-source miniscope analysis pipeline. *eLife*: 11:e70661.

Pennington ZT, Diego KS, Francisco TR, LaBanca AR, Lamsifer SI, Liobimova O, Shuman T, Cai DJ (2021). ezTrack – A step by step by step guide to behavior tracking. *Current Protocols in Neuroscience*, 1(10): e255.

Blaze J, Navickas A, Phillips HL, Heissel S, Plaza-Jennings A, Miglani A, Asgharian H, Foo M, Katanski CD, Watkins CP, **Pennington ZT**, Javidfar B, Espeso-Gil S, Rostandy B, Alwaseem H, Hahn CG, Molina H, Cai DJ, Pan T, Yao WD, Goodarzi H, Haghighi F, Akbarian S (in

press). Neuronal Nsun2 deficiency produces tRNA epitranscriptomic alterations and proteomic shifts impacting synaptic signaling and behavior. *Nature Communications*, 12(1): 4913.

Lichtenberg NT, Sepe-Forrest L, **Pennington ZT**, Lamparelli AC, Greenfield VY, Wassum KM (2021). The medial orbitofrontal cortex → basolateral amygdala circuit regulates the influence of reward cues on adaptive behavior and choice. *Journal of Neuroscience*, 41(34): 7267-7277.

Rajbhandari AK, Oceau JC, Gonzalez S, **Pennington ZT**, Mohamed F, Trott J, Chavez J, Ngyuen E, Keces N, Hong WZ, Heve RL, Waschek J, Khakh BS, Fanselow MS (2021). A basomedial amygdala to intercalated cells microcircuit expressing PACAP and its receptor PAC1 regulates contextual fear. *Journal of Neuroscience*, 41(15): 3446-61.

Shuman T, Aharoni D, Cai DJ, Lee CR, Chavlis S, Page-Harley L, Vetere LM, Feng Y, Yang CY, Mollinedo-Gajate I, Chen L, **Pennington ZT**, Taxidis J, Flores SE, Cheng K, Javaherian M, Kaba CC, Rao N, La-Vu M, Pandi I, Shtrahman M, Bakhurin KI, Masmanidis SC, Khakh BS, Poirazi P, Silva AJ, Golshani P (2020). Breakdown of spatial coding and neural synchronization in pilocarpine-treated epileptic mice. *Nature Neuroscience*, 23(2): 229-238.

Pennington ZT, Trott JM, Rajbhandari AK, Li K, Walwyn WM, Evans CJ, Fanselow MS (2020). Chronic opioid pretreatment potentiates the sensitization of fear learning by trauma. *Neuropsychopharmacology*, 45(3): 482-490.

Pennington ZT, Dong Z, Feng Y, Vetere LM, Page-Harley L, Shuman T, Cai DJ (2019). ezTrack: An open-source video analysis pipeline for the investigation of animal behavior. *Scientific Reports*, 9(1): 19979.

Kosarussavadi S*, **Pennington ZT***, Covell C, Schlinger BA (2017). Across sex and age: Learning and memory and patterns of avian hippocampal gene expression. *Behavioral Neuroscience*, 131(6): 483-491.

*Joint first authors

Pennington ZT, Anderson AS, Fanselow MS (2017). The ventromedial prefrontal cortex in a model of traumatic stress: Fear inhibition or contextual processing? *Learning & Memory*, 24(9): 400-406.

Lichtenberg NT, **Pennington ZT**, Holley SM, Greenfield VY, Cepeda C, Levine MS, Wassum KM (2017). Basolateral amygdala to orbitofrontal cortex projections enable cue-triggered reward expectations. *Journal of Neuroscience*, 37(35): 8374-8384.

James AS, **Pennington ZT**, Tran P, Jentsch JD (2015). Compromised NMDA/glutamate receptor expression in dopaminergic neurons impairs instrumental learning, but not Pavlovian goal-tracking or sign-tracking. *eNeuro*, 2(3): e0040-14.

Reviews and Commentaries:

Pennington ZT, Cai DJ (2021). Propanolol inhibits reactivation of fear memory. *Biological Psychiatry*, 89(12):1111-12.

Fanselow MS, **Pennington ZT** (2018). A return to the dark ages of psychiatry with a two-system framework for the study of fear. *Behaviour Research and Therapy*, 100:24-29.

Pennington ZT, Fanselow MS (2018). Indirect targeting of sub-superficial brain structures with transcranial magnetic stimulation reveals a promising way forward in the treatment of fear. *Biological Psychiatry*, 84(2): 80-81.

Fanselow MS, **Pennington ZT** (2017). The Danger of LeDoux & Pine's Two System Framework for Fear. *American Journal of Psychiatry*, 174(11): 1120-1121.

Jentsch JD, Ashenhurst JR, Cervantes MC, Groman SM, James AS, **Pennington ZT** (2014). Dissecting Impulsivity and its relationship to addictions. *Annals of the New York Academy of Sciences*, 1327(1): 1-26.

Jentsch JD, **Pennington ZT** (2014). Reward, interrupted: inhibitory control and its relevance to addictions. *Neuropharmacology*, 76B: 479-486.

Professional Activities and Service

2021-present	Founder/Organizer, Sinai Anxiety Fear and Trauma Journal Club
2021-2022	Chair, Mount Sinai Neuroscience Postdoctoral Association
2021	Instructor, Virtual Miniscope Workshop
2019	Instructor, CAJAL Advanced Neuroscience Training Programme
2019-2020	Committee Member, Mount Sinai Neuroscience Postdoctoral Association
2018-2021	Committee Member, Mount Sinai Neuroscience Seminars
2015-2017	Graduate Student Mentor, UCLA <i>Undergraduate Research Journal of Psychology</i>

Teaching

2022-present	Invited Lecturer at Icahn School of Medicine at Mount Sinai Courses Taught: <ul style="list-style-type: none">• Neuro Core Unit 3, Behavioral and Cognitive Neuroscience• Techniques and Approaches in Neuroscience
2016-2017	Instructor at UCLA Average Overall Rating: 8.4/9 (N = 70) Courses Taught: <ul style="list-style-type: none">• Psych 15, Introductory Psychobiology (2 school quarters)
2012-2018	Teaching Assistant at UCLA Average Overall Rating: 8/9 (N = 291) Courses Taught: <ul style="list-style-type: none">• Psychology 110, Fundamentals of Learning (1 school quarter)• Psychology 115, Principles of Behavioral Neuroscience (3 school quarters)• Psychology 116, Behavioral Neuroscience Laboratory (6 school quarters)• Neuroscience M101L, Neuroscience Laboratory (1 school quarter)

Research Advising

Research Mentor at Icahn School of Medicine at Mount Sinai

2023-Present	Shereen Abdel-Raheim, Undergraduate in Cai Lab
2022-Present	Patlapa Sompolpong, Research Associate in Cai Lab <ul style="list-style-type: none">• Author on Pennington et al. BioRxiv, 2023• Poster presenter at SFN 2022
2020-2022	Alexa LaBanca, Research Associate in Cai Lab <ul style="list-style-type: none">• Author on Pennington et al. BioRxiv, 2023• Author on Pennington et al. Current Protocols in Neuroscience, 2021

- First author poster presentations at SFN 2021, SFN 2022, Mount Sinai Neuroscience Retreat 2021, Mount Sinai Neuroscience Retreat 2022
- 2019-2021 Taylor Francisco, Neuroscience and Behavior Student at Columbia
- Author on Pennington et al. Current Protocols in Neuroscience, 2021
 - First author poster presentation at SACNAS 2021.

Senior Thesis Mentor at UCLA

- 2018-2018 Kevin Li, Psychobiology
- Author on Pennington et al. Neuropsychopharmacology, 2020
 - First author poster presentation at UCLA Psychology Undergraduate Research Conference 2018
- 2017-2018 Dimyana Hana, Neuroscience
- First author poster presentation at UCLA Neuroscience Undergraduate Research Conference 2018
- 2015-2016 Austin Anderson, Psychobiology,
- Author on Pennington et al. Learning & Memory, 2017
 - First author poster presentation at UCLA Psychology Undergraduate Research Conference 2016
- 2013-2014 Patricia Stan, Neuroscience
- First author poster presentation at UCLA Psychology Undergraduate Research Conference 2014
- 2012-2013 Kyra Phillips, Psychology
- First author poster presentation at UCLA Psychology Undergraduate Research Conference 2013
- 2012-2013 Taylor Clark, Psychology
- First author poster presentation at UCLA Psychology Undergraduate Research Conference 2013

Press and Media

- 2021 *Neuropsychopharmacology* Press Release
- 2017 *Society for Neuroscience* Press Release

Invited Talks:

- 2022 UT Southwestern, El Paso. Learning Technology Seminar Series (Virtual)

Reviewer:

Journal Review:

- Neuropsychopharmacology*, Reviewer (since 2021)
- Journal of Neuroscience*, Reviewer (since 2023)

References:

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