

# Zachary T. Pennington, PhD

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## Current Position

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

## Education & Training

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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

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### *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

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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

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| 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:

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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:

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### Preprints:

**Pennington ZT**, LaBanca A, Sompolpong P, Christenson Wick Z, Feng Y, Dong Z, 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/10.1101/2023.02.27.530077>

### 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, Schlenger 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, Ashenurst 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

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| 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

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

## Research Advising

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### ***Research Mentor at Icahn School of Medicine at Mount Sinai***

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| 2023-Present | Shereen Abdel-Raheim, Undergraduate in Cai Lab   |
| 2022-Present | Patlapa Sompolpong, Research Associate in Cai Lab <ul style="list-style-type: none"><li>• Author on Pennington et al. BioRxiv, 2023</li><li>• Poster presenter at SFN 2022</li></ul>   |
| 2020-2022    | Alexa LaBanca, Research Associate in Cai Lab <ul style="list-style-type: none"><li>• Author on Pennington et al. BioRxiv, 2023</li><li>• Author on Pennington et al. Current Protocols in Neuroscience, 2021</li><li>• First author poster presentations at SFN 2021, SFN 2022, Mount Sinai Neuroscience Retreat 2021, Mount Sinai Neuroscience Retreat 2022</li></ul> |
| 2019-2021    | Taylor Francisco, Neuroscience and Behavior Student at Columbia <ul style="list-style-type: none"><li>• Author on Pennington et al. Current Protocols in Neuroscience, 2021</li><li>• First author poster presentation at SACNAS 2021.</li></ul>   |

## **Senior Thesis Mentor at UCLA**

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| 2018-2018 | Kevin Li, Psychobiology <ul style="list-style-type: none"><li>• Author on Pennington et al. <i>Neuropsychopharmacology</i>, 2020</li><li>• First author poster presentation at UCLA Psychology Undergraduate Research Conference 2018</li></ul>       |
| 2017-2018 | Dimyana Hana, Neuroscience <ul style="list-style-type: none"><li>• First author poster presentation at UCLA Neuroscience Undergraduate Research Conference 2018</li></ul>   |
| 2015-2016 | Austin Anderson, Psychobiology, <ul style="list-style-type: none"><li>• Author on Pennington et al. <i>Learning &amp; Memory</i>, 2017</li><li>• First author poster presentation at UCLA Psychology Undergraduate Research Conference 2016</li></ul> |
| 2013-2014 | Patricia Stan, Neuroscience <ul style="list-style-type: none"><li>• First author poster presentation at UCLA Psychology Undergraduate Research Conference 2014</li></ul>  |
| 2012-2013 | Kyra Phillips, Psychology <ul style="list-style-type: none"><li>• First author poster presentation at UCLA Psychology Undergraduate Research Conference 2013</li></ul>  |
| 2012-2013 | Taylor Clark, Psychology <ul style="list-style-type: none"><li>• First author poster presentation at UCLA Psychology Undergraduate Research Conference 2013</li></ul>   |

## **Press and Media**

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| 2021 | <i>Neuropsychopharmacology</i> Press Release  |
| 2017 | <i>Society for Neuroscience</i> Press Release |

## **Invited Talks:**

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| 2022 | UT Southwestern, El Paso. Learning Technology Seminar Series (Virtual) |
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## **Reviewer:**

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### **Journal Review:**

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

## **References:**

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Department of Neuroscience  
Icahn School of Medicine at Mount Sinai  
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**Michael Fanselow, Ph.D.**

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**Eric Nestler, MD, Ph.D.,**

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