

Zachary T. Pennington, PhD

Postdoctoral Fellow
Laboratory of Dr. Denise Cai
Department of Neuroscience, Icahn School of Medicine at Mount

website: ZachPenn.github.io

email: Zachary.Pennington@mssm.edu

Education:

2018 PhD Psychology, UCLA
Behavioral Neuroscience Major with Quantitative Minor
Laboratory of Dr. Michael Fanselow
2010 BA Psychology, UCLA.
UCLA
2008 AA, Pasadena City College

Professional Activities

2021 - Chair of Mount Sinai Neuroscience Postdoctoral Association
2021 - Founder/Organizer of Sinai Anxiety Fear and Trauma Journal Club
2021- Neuropsychopharmacology, *ad hoc reviewer*
2019-2020 Mount Sinai Neuroscience Postdoctoral Association Member
2018-21 Mount Sinai Neuroscience Seminars Selection Committee Member
2015-17 Graduate Student Mentor for the *Undergraduate Research Journal of Psychology at UCLA*

Fellowships, Awards and Honors:

2018-2019 NIDA T32 Postdoctoral Fellowship: Mount Sinai Interdisciplinary Training in Drug Abuse
2017-2018 UCLA Dissertation Year Fellowship
2017 UCLA Teaching Practicum Program Fellow
2016 UCLA Teaching Practicum Program Fellow
2015-17 F31 Ruth L. Kirschstein National Research Service Award (NRSA), Individual Predoctoral Fellowship. Awarded by National Institute of Mental Health.
2015 UCLA Brain Research Institute, Society for Neuroscience Travel Award
2012-14 NIDA T32 Predoctoral Fellowship: UCLA Translational Neuroscience of Drug Abuse
2012 Travel Award to attend the conference on Behavior, Biology and Chemistry: Translational Research in Addiction
2012 UCLA Graduate Summer Research Mentorship Fellowship

2008 Opal Jones Trust Scholarship in Psychology. Pasadena City College
2008 Valedictorian of Pasadena City College

Technical Skills

Computer programming

Software development in Python, R, ImageJ, Matlab, and GitHub. Focus on 2d, 3d, and live image processing and feature extraction.

Statistics

Implementation of hierarchical/mixed models, multiple regression, generalized linear models, and broad knowledge of general linear model framework in R, Python, and SPSS.

Microscopy

Confocal, light-sheet, and fluorescence microscopy of cleared whole brains and brain sections.

Animal Behavior

Modeling neuropsychiatric phenotypes and studying learning/memory in rodents.

In vivo calcium imaging, intravenous self-administration, sleep somnography, pharmacological manipulations, instrumental and associative learning preparations.

Publications:

Research Reports

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

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*, Online ahead of print.

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*, Online ahead of print.

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**, Greenfield VY, Wassum KW (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). Propranolol 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.

Teaching Experience:

Instructor at UCLA

Average Overall Professor Rating: 8.4/9 (N = 70)

Courses Taught: Psych 15, Introductory Psychobiology (2 school quarters)

Teaching Assistant at UCLA

Average Overall Teaching Assistant Rating: 8/9 (N = 291)

Courses Taught: 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)

Student Mentor at Icahn School of Medicine at Mount Sinai

Taylor Francisco, Neuroscience and Behavior Student at Columbia

*Author on Pennington et al. Current Protocols in Neuroscience, 2021

Senior Thesis Mentor at UCLA

Kevin Li, Psychobiology, 2017-2018

*Author on Pennington et al. Neuropsychopharmacology, 2020

Dimyana Hana, Neuroscience, 2017-2018

Austin Anderson, Psychobiology, 2015-2016

*Author on Pennington et al. Learning & Memory, 2017

Patricia Stan, Neuroscience, 2013-2014

Kyra Phillips, Psychology, 2012-2013

Taylor Clark, Psychology, 2012-2013