

## David Joshua Ottenheimer

Ph.D., Neuroscience, JOHNS HOPKINS UNIVERSITY, Baltimore, MD, USA (2020)

B.S., Psychology, YALE UNIVERSITY, New Haven, CT, USA (2014)

### Research experience (selected)

Postdoctoral Scholar, UNIVERSITY OF WASHINGTON, Seattle. 2020 – present.

Mentor: Garret Stuber (co-mentor: Nick Steinmetz)

- Characterized genetic classes of cells in mouse and rat ventral pallidum and determined the transcriptional impact of high fat diet using RNA-sequencing and data analysis.
- Analyzed and integrated single nucleus RNA-seq and ATAC-seq data to determine the impact of drug administration on lateral habenula cell types.
- Investigated brainwide immediate early gene expression in response to high fat diet exposure using brain clearing and light sheet imaging.
- Discovered widespread coding properties in the brain by conducting electrophysiology (Neuropixels) and imaging (two-photon GRIN lens) experiments and developing novel computational models of brain activity.

PhD Candidate, JOHNS HOPKINS UNIVERSITY, Baltimore. 2015 – 2020.

Mentor: Patricia Janak

- Discovered a novel role for an understudied brain region (ventral pallidum) in reward processing using electrophysiology, optogenetic neuromodulation, and computational modeling.
- Determined coding properties in multiple brain regions using machine learning and multivariate statistics to relate subject behavior, task features, and brain activity.

Research Assistant, YALE UNIVERSITY, New Haven. 2014 – 2015.

Mentor: Ralph DiLeone

- Responsible for genetic mouse line management, cloning, cell culture, virus packaging, and day-to-day lab operations.

### Publications

- **Ottenheimer, D.J., Simon, R.C., Burke, C.T., Bowen, A.J., Ferguson, S.M., Stuber, G.D., 2024. Single-cell sequencing of rodent ventral pallidum reveals diverse neuronal subtypes with non-canonical interregional continuity. [bioRxiv](#).**
- **Ottenheimer, D.J.\*, Vitale, K.R.\*, Ambroggi, F., Janak, P.H. and Saunders, B.T., 2024. Basolateral amygdala population coding of a cued reward seeking state depends on orbitofrontal cortex. [bioRxiv](#).**
- Fraser, K.M., Collins, V.L., Wolff, A.R., Ottenheimer, D.J., Bornhoft, K.N., Pat, F., Chen, B.J., Janak, P.H. and Saunders, B.T., 2023. Contexts facilitate dynamic value encoding in the mesolimbic dopamine system. [bioRxiv](#).

- Fraser, K.M., Kim, T.H., Castro, M., Drieu, C., Padovan-Hernandez, Y., Chen, B., Pat, F., Ottenheimer, D.J. and Janak, P.H., 2023. Encoding and context-dependent control of reward consumption within the central nucleus of the amygdala. *bioRxiv*.
- Ottenheimer, D.J.\*, Hjort, M.M.\*, Bowen, A.J.\*, Steinmetz, N.A., and Stuber, G.D., 2023. A stable, distributed code for cue value in mouse cortex during reward learning. *eLife*, 12, p.RP84604.
- Vandaele, Y., Ottenheimer, D.J. and Janak, P.H., 2021. Dorsomedial striatal activity tracks completion of behavioral sequences in rats. *eNeuro*, 8(6).
- Ottenheimer, D.J., Wang, K., Tong, X., Fraser, K.M., Padovan-Hernandez, Y., Richard, J.M. and Janak, P.H., 2020. Satiety-sensitive preference encoding in ventral pallidum drives reward decisions. *Science Advances*, 6(45), p.eabc9321.
- Ottenheimer, D.J.\*, Bari, B.A.\*, Sutlief, E., Fraser, K.M., Kim, T.H., Richard, J.M., Cohen, J.Y. and Janak, P.H., 2020. A quantitative reward prediction error signal in ventral pallidum. *Nature Neuroscience*, 23(10), pp.1267-1276.
- Vandaele, Y., Mahajan, N.R., Ottenheimer, D.J., Richard, J.M., Mysore, S.P. and Janak, P.H., 2019. Distinct recruitment of dorsomedial and dorsolateral striatum erodes with extended training. *eLife*, 8, p.e49536.
- Ottenheimer, D.J., Wang, K., Haimbaugh, A., Janak, P.H. and Richard, J.M., 2019. Recruitment and disruption of ventral pallidal cue encoding during alcohol seeking. *European Journal of Neuroscience*, 50(9), pp.3428-3444.
- Ottenheimer, D., Richard, J.M. and Janak, P.H., 2018. Ventral pallidum encodes relative reward value earlier and more robustly than nucleus accumbens. *Nature communications*, 9(1), pp.1-14.
- Conant, K., Daniele, S., Bozzelli, P.L., Abdi, T., Edwards, A., Szklarczyk, A., Ottenheimer, D. and Maguire-Zeiss, K., 2017. Matrix metalloproteinase activity stimulates N-cadherin shedding and the soluble N-cadherin ectodomain promotes classical microglial activation. *Journal of neuroinflammation*, 14(1), p.56.
- Jin, L.E., Wang, M., Yang, S.T., Yang, Y., Galvin, V.C., Lightbourne, T.C., Ottenheimer, D., Zhong, Q., Stein, J., Raja, A. and Paspalas, C.D., 2017. mGluR2/3 mechanisms in primate dorsolateral prefrontal cortex: evidence for both presynaptic and postsynaptic actions. *Molecular psychiatry*, 22(11), pp.1615-1625.
- Zhu, X., Ottenheimer, D. and DiLeone, R.J., 2016. Activity of D1/2 receptor expressing neurons in the nucleus accumbens regulates running, locomotion, and food intake. *Frontiers in behavioral neuroscience*, 10, p.66.

## Fellowships and awards

- 2021-2024 Ruth L. Kirschstein National Research Service Award (NRSA)  
Individual Postdoctoral Fellowship: NIH F32 DA053714
- 2020 UW NAPE Center two-photon pilot project award
- 2017-2020 National Science Foundation Graduate Research Fellowship Program
- 2016 1st place, Lasker Essay Contest on translational biomedical research

## Honors

- 2020 Graduate student speaker, Johns Hopkins School of Medicine Convocation
- 2020 The Michael A. Shanoff Research Award, Young Investigators' Day,  
Johns Hopkins School of Medicine
- 2018 Tianqiao and Chrissy Chen Fellowship, 83rd Cold Spring Harbor Laboratory  
Symposium on Quantitative Biology
- 2018 2nd place (senior students), Johns Hopkins School of Medicine  
Graduate Student Association Poster Session
- 2014 Inducted into Phi Beta Kappa (Yale University)
- 2014 Magna Cum Laude (Yale University)
- 2014 Distinction in the Neuroscience Track of Psychology (Yale University)
- 2012 Invited to Psi Chi: National Honor Society in Psychology
- 2010-2014 IBM Thomas J. Watson Memorial Scholarship
- 2010 National Merit Scholar

## Courses

- 2018 Janelia Junior Scientist Workshop on Mechanistic Cognition, Janelia  
Research Campus

## Presentations

### Talks

- SEP. 2023 University of Washington Pharmacology Retreat. Brainbridge, WA.
- OCT. 2022 Allen Institute Neural Dynamics Seminar Series. Seattle, WA.
- JUNE 2022 UW Biological Structure Annual Trainee Symposium. Seattle, WA.
- MAY 2022 UW Neuroscience Seminar Series. Seattle, WA.
- MAY 2022 UW Neural Computation and Engineering Connection. Seattle, WA.
- MAY 2021 UW NAPE Center Seminar. Seattle, WA.
- AUG. 2019 GRS Catecholamines. Newry, ME.
- MAR. 2019 Baltimore Brain Series. Baltimore, MD.
- OCT. 2018 Janelia Junior Scientist Workshop. Ashburn, VA.
- JUNE 2018 83rd Symposium on Quantitative Biology. Cold Spring Harbor, NY.
- OCT. 2017 Johns Hopkins Neuroscience Lab Lunch. Baltimore, MD.
- FEB. 2014 Berkeley Commonplace Mellon Forum. New Haven, CT.

## Posters

JULY 2022 GRC Optogenetics. Newry, ME.  
MAR. 2020 COSYNE. Denver, CO.  
OCT. 2019 Society for Neuroscience. Chicago, IL.  
SEP. 2019 Johns Hopkins Department of Neuroscience Retreat. Ashburn, VA.  
AUG. 2019 GRC Catecholamines. Newry, ME.  
MAR. 2019 COSYNE. Lisbon, Portugal.  
NOV. 2018 Society for Neuroscience. San Diego, CA.  
SEP. 2018 Johns Hopkins Department of Neuroscience Retreat. Cambridge, MD.  
JUNE 2018 83rd Symposium on Quantitative Biology. Cold Spring Harbor, NY.  
MAY 2018 Johns Hopkins Graduate Student Association poster session. Baltimore, MD.  
NOV. 2017 Society for Neuroscience. Washington D.C.  
SEP. 2017 Johns Hopkins Department of Neuroscience Retreat. Cambridge, MD.

## Service and Leadership

Oct. 2022, 2023 Presenter, NAPE Center Imaging & Genetics Workshop  
May 2022 Moderator, UW Neural Computation and Engineering Connection  
Nov. 2018 - May 2020 Member, Johns Hopkins Ph.D. Advisory Committee  
Sep. 2017 - Jun. 2019 Contributor, Johns Hopkins Biomedical Odyssey Blog  
Jul. 2017 - May 2020 Founder/Member, Neuroscience Dept. Student Diversity Committee  
Jun. 2017 - Oct. 2019 Co-leader, Neuroscience Dept. NSF GRFP Workshop  
Apr. 2017 - Oct. 2019 Member, Neuroscience Dept. Committee on Diversity & Inclusion  
Jan. - May 2017 Teaching assistant, Neuroscience and Cognition II graduate course  
Jul. 2016 - Sep. 2018 Co-chair, Neuroscience Department Retreat Committee  
Aug. 2016 Workshop Co-leader, NIH-RISE at Morgan State University  
June 2016 - May 2020 Neuroscience Department Ph.D. Recruitment Committee  
June 2016 - May 2019 Neuroscience Department Student Representative  
Sep. 2015 - May 2018 Lead Mentor, STEM Achievement in Baltimore Elementary Schools