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 – 2024.
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 and heroin self-administration using RNA-sequencing and data analysis.
- Additional RNA-sequencing studies and analysis in regions including nucleus accumbens, prelimbic cortex, paraventricular thalamus, and lateral habenula.
- 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.*, Vitale, K.R.*, Ambroggi, F., Janak, P.H. and Saunders, B.T., 2024. Orbitofrontal cortex mediates sustained basolateral amygdala encoding of cued reward seeking states. Journal of Neuroscience.**

- Fraser, K.M., Kim, T.H., Castro, M., Drieu, C., Padovan-Hernandez, Y., Chen, B., Pat, F., Ottenheimer, D.J. and Janak, P.H., 2024. Encoding and context-dependent control of reward consumption within the central nucleus of the amygdala. iScience, 27(5).

- **Ottenheimer, D.J., Simon, R.C., Burke, C.T., Bowen, A.J., Ferguson, S.M., and Stuber, G.D., 2024. Single-cell sequencing of rodent ventral pallidum reveals diverse neuronal subtypes with non-canonical interregional continuity. 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.

- **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
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
2014	Inducted into Phi Beta Kappa (Yale University)
2014	Magna Cum Laude (Yale University)
2014	Distinction in the Neuroscience Track of Psychology (Yale University)
2010-2014	IBM Thomas J. Watson Memorial Scholarship
2010	National Merit Scholar

Courses

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

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.

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