

# Christopher A Zimmerman, PhD

NIH BRAIN Initiative K99 Fellow  
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## EDUCATION

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2019 PhD, Neuroscience, University of California San Francisco  
2016 MS, Neuroscience, University of California San Francisco  
2013 BS, Neuroscience, University of Pittsburgh  
2013 BSE, Bioengineering, University of Pittsburgh

## POSITIONS

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2019–2025 Postdoctoral Fellow, Princeton Neuroscience Institute and HHMI  
Advisor: Ilana B Witten, PhD  
2013–2019 Graduate Student, UCSF Department of Physiology and HHMI  
Advisor: Zachary A Knight, PhD  
Thesis: The neural basis of thirst

## HONORS AND AWARDS

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2023 NIH BRAIN Initiative K99 Advanced Postdoctoral Career Transition Award  
2022 McKnight Foundation Allison J Doupe Fellowship  
2020 Helen Hay Whitney Foundation Postdoctoral Fellowship  
2020 Donald B Lindsley Prize in Behavioral Neuroscience, Society for Neuroscience  
2020 Eppendorf and *Science* Prize for Neurobiology, AAAS  
2020 Harold M Weintraub Graduate Student Award, Fred Hutchinson Cancer Center  
2020 Winter Conference on Brain Research Travel Fellowship  
2017 NIH National Research Service Award Predoctoral Fellowship  
2016 Genentech Foundation Predoctoral Fellowship  
2015 UCSF Discovery Fellowship  
2013 NSF Graduate Research Fellowship

## PUBLICATIONS

Asterisks (\*) denote co-first authors. Daggers (†) denote co-corresponding authors.

### Research articles as first or corresponding author

Zimmerman CA<sup>†</sup>, Bolkan SS, Pan-Vazquez A, Wu B, Keppler EF, Meares-Garcia JB, Guthman EM, Fetcho RN, McMannon B, Lee J, Hoag AT, Lynch LA, Janarthanan SR, López Luna JF, Bondy AG, Falkner AL, Wang SSH, Witten IB<sup>†</sup>. A neural mechanism for learning from delayed postingestive feedback. *bioRxiv*, 2023. *Nature*, 2025.

Zhukovskaya A, Zimmerman CA<sup>†</sup>, Willmore L, Pan-Vazquez A, Janarthanan SR, Lynch LA, Falkner AL, Witten IB<sup>†</sup>. Heightened lateral habenula activity during stress produces brainwide and behavioral substrates of susceptibility. *bioRxiv*, 2023. *Neuron* 112, 3940–3956, 2024.

Zimmerman CA, Huey EL, Ahn JS, Beutler LR, Tan CL, Kosar S, Bai L, Chen Y, Corpuz TV, Madisen L, Zeng H, Knight ZA. A gut-to-brain signal of fluid osmolarity controls thirst satiation. *Nature* 568, 98–102, 2019.

Leib DE\*, Zimmerman CA\*, Poormoghaddam A, Huey EL, Ahn JS, Lin YC, Tan CL, Chen Y, Knight ZA. The forebrain thirst circuit drives drinking through negative reinforcement. *Neuron* 96, 1272–1281, 2017.

Zimmerman CA, Lin YC, Leib DE, Guo L, Huey EL, Daly GE, Chen Y, Knight ZA. Thirst neurons anticipate the homeostatic consequences of eating and drinking. *Nature* 537, 680–684, 2016.

## Research articles as contributing author

Cox J<sup>†</sup>, Minerva AR, Fleming WT, [Zimmerman CA](#), Hayes C, Zorowitz S, Bandi A, Ornelas S, McMannon B, Parker NF, Witten IB<sup>†</sup>. A neural substrate of sex-dependent modulation of motivation. *bioRxiv*, 2022. *Nature Neuroscience* 26, 274–284, 2023.

Bolkan SS\*, Stone IR\*, Pinto L, Ashwood ZC, Iravedra Garcia JM, Herman AL, Singh P, Bandi A, Cox J, [Zimmerman CA](#), Cho JR, Engelhard B, Pillow JW<sup>†</sup>, Witten IB<sup>†</sup>. Opponent control of behavior by dorsomedial striatal pathways depends on task demands and internal state. *bioRxiv*, 2021. *Nature Neuroscience* 25, 345–357, 2022.

Tan CL, Cooke EK, Leib DE, Lin YC, Daly GE, [Zimmerman CA](#), Knight ZA. Warm-sensitive neurons that control body temperature. *Cell* 167, 47–59, 2016.

Chen Y, Lin YC, [Zimmerman CA](#), Essner RA, Knight ZA. Hunger neurons drive feeding through a sustained, positive reinforcement signal. *eLife* 5, e18640, 2016.

Luongo FJ, [Zimmerman CA](#), Horn ME, Sohal VS. Correlations between prefrontal neurons form a small world network that optimizes the generation of multineuron sequences of activity. *Journal of Neurophysiology* 115, 2359–2375, 2016.

## Review and commentary articles

[Zimmerman CA](#). Neuroscience: Secretin excites the thirst circuit. *Current Biology* 32, R1318–R1320, 2022.

[Zimmerman CA](#). The origins of thirst. *Science* 370, 45–46, 2020.

[Zimmerman CA](#), Knight ZA. Layers of signals that regulate appetite. *Current Opinion in Neurobiology* 64, 79–88, 2020.

[Zimmerman CA](#), Leib DE, Knight ZA. Neural circuits underlying thirst and fluid homeostasis. *Nature Reviews Neuroscience* 18, 459–469, 2017.

Leib DE, [Zimmerman CA](#), Knight ZA. Thirst. *Current Biology* 26, R1260–R1265, 2016.

## DEPARTMENTAL SEMINARS

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Max Planck Institute for Biological Intelligence. Sep 2025.

Sainsbury Wellcome Centre. Mar 2025.

Johns Hopkins Schizophrenia Center. Jan 2025.

Mount Sinai Department of Neuroscience. Dec 2024.

Princeton/Rutgers Conte Center for Understanding Latent Cause Inference. May 2024.

Princeton Neuroscience Institute Retreat. May 2023.

Helen Hay Whitney Foundation Retreat. Nov 2022.

Scripps Department of Neuroscience. Sep 2018.

UCSF Neuroscience Retreat. Sep 2016.

UCSF Diabetes and Obesity Retreat. Sep 2015.

## CONFERENCE TALKS

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Engrams and Ensembles in Learning and Memory. Dublin, Ireland. May 2025.

Winter Conference on Brain Research. Lake Tahoe, CA. Jan 2025.

Janelia Conference on the Sensory Biology of Ingestion. Ashburn, VA. Nov 2024.

Cosyne Main Meeting. Lisbon, Portugal. Mar 2024.

Hellenic Society for Neuroscience Meeting. Virtual. Oct 2021.

Keystone Symposium on Synapses and Circuits. Santa Fe, NM. Mar 2017.

## TEACHING AND MENTORSHIP

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2021–2022 Princeton Neuroscience Institute Undergraduate Junior Tutorial Course Instructor

2021–2022 Princeton Neuroscience Institute Graduate Student Bootcamp Course Instructor

2021	Neuromatch Academy Computational Neuroscience Course Mentor
2021–2025	Trainee Supervision in the Witten Lab: 4 PhD Rotations, 3 Technicians, 2 Undergraduates
2020–2023	Princeton Neuroscience Institute Graduate Student Journal Club Course Instructor
2019	UCSF Science and Health Education Partnership Teaching Volunteer
2015	UCSF School of Dentistry Cell Physiology Course Teaching Assistant
2014–2019	Trainee Supervision in the Knight Lab: 4 PhD Rotations, 3 Technicians, 1 Undergraduate

## PROFESSIONAL SERVICE

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2025	Winter Conference on Brain Research Session Co-chair
2024	Princeton Neuroscience Institute TigerBrain Postdoc Symposium Co-organizer
2024	ERC Consolidator Grant Reviewer
2023–2024	Cosyne Reviewer
2021–2022	Princeton Neuroscience Institute Seminar Series Committee
2021–	Journal Peer Review: <i>Nature</i> , <i>Nature Neuroscience</i> , <i>Current Biology</i> , <i>Current Opinion in Neurobiology</i> , <i>PLOS One</i> , <i>Science Advances</i> , <i>Scientific Reports</i> , <i>STAR Protocols</i>

## PRESS AND MEDIA

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*Current Biology*, [Associative learning: A mechanism for conditioned taste aversion](#). Apr 2025.  
 Science News, [Mouse brains hint at why it's so hard to forget food poisoning](#). Apr 2025.  
 National Geographic, [Hate cilantro or anchovies? Evolutionary science could explain why](#). Apr 2025.  
 Princeton Neuroscience Institute, [How the brain remembers what gave you food poisoning](#). Apr 2025.  
 Sainsbury Wellcome Centre, [Q&A: How the brain learns what made you sick](#). Mar 2025.  
 Princeton Neuroscience Institute, [Brain region critical for coping with chronic stress identified](#). Oct 2024.  
 The Transmitter, [‘It must be something I ate’ is hard-wired into the brain](#). Mar 2024.  
 Cosyne, [Cosyne Main Meeting talk recording \(Session 3: Learning\)](#). Mar 2024.  
 Scientific American, [Your body has a clever way to detect how much water to drink](#). Sep 2022.  
 Society for Neuroscience, [Society for Neuroscience presents 2020 Lindsley Prize](#). Oct 2020.  
 Naked Neuroscience Podcast, [How does thirst work in the brain?](#). Oct 2020.  
 Inverse, [Scientists discover the origin of thirst in the brain](#). Oct 2020.  
 Eppendorf, [Research on thirst wins 2020 Eppendorf and Science Prize](#). Oct 2020.  
 AAAS, [Real-time signals from body to brain help regulate sensation of thirst](#). Oct 2020.  
 Fred Hutchinson Cancer Center, [Fred Hutch announces 2020 Weintraub Award recipients](#). Mar 2020.  
*Nature Reviews Gastroenterology & Hepatology*, [A thirst-quenching gut–brain signal](#). Apr 2019.  
 NHLBI, [Your gut controls your thirst and keeps your brain informed](#). Mar 2019.  
 Inscopix, [A gut check tells the brain about thirst](#). Mar 2019.  
 NPR, [Blech! Brain science explains why you're not thirsty for salt water](#). Mar 2019.  
 HHMI, [Thirst controlled by signal from the gut](#). Mar 2019.  
 UCSF, [Had enough water? Brain's thirst centers make a gut check](#). Mar 2019.  
*Cell*, [Firing up in anticipation](#). Nov 2016.  
*Nature*, [Forecast for water balance](#). Sep 2016.  
*Nature Podcast*, [Scientists quench a decades-old question about thirst](#). Aug 2016.  
 STAT, [Thirsty? Your brain knows before you do](#). Aug 2016.  
 BBC, [Brain's thirst circuit 'monitors the mouth'](#). Aug 2016.  
 UCSF, [New understanding of thirst emerges from brain study](#). Aug 2016.