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Jonathan W. Pillow

Education

Ph.D., New York University, Center for Neural Science — 1998-2005
Thesis: "Neural coding and the statistical modeling of neuronal responses."
Thesis Advisor: Eero Simoncelli

B.A. with honors, *summa cum laude*. — 1993-1997
University of Arizona. majors: mathematics and philosophy

Academic Positions

Professor, Princeton Neuroscience Institute. Princeton University — 2019-present

Associate Professor, Princeton Neuroscience Institute & Department of Psychology. Princeton University — 2016-2019

Assistant Professor, Princeton Neuroscience Institute & Department of Psychology. Princeton University — 2014-2016

Assistant Professor, Departments of Psychology, Neuroscience, & Statistics, Center For Perceptual Systems, The University of Texas at Austin. — 2009-2014

Postdoctoral Fellow, Gatsby Computational Neuroscience Unit, UCL — 2005-2008

Postdoctoral Fellow, NYU and Howard Hughes Medical Institute — May-Oct 2005

Honors & Awards

Princeton University Graduate Mentoring Award	2019
Simons Collaboration on the Global Brain Research Award	2015&2018
Presidential Early Career Award for Scientists and Engineers (PECASE)	2014
NSF Career Award	2012-2017
McKnight Scholar Award	2012-2015
NSF Mentorship Travel Grant, Cosyne Annual Meeting	2012
Sloan Research Fellow	2011-2012
Royal Society USA/Canada Research Fellowship	2005-2008
Dean's Dissertation Fellowship Award	2003-2004
Best Student Paper, Neural Information Processing Systems (NIPS)	2003
National Science Foundation Graduate Fellowship	1997-2000
NCAA Graduate Fellowship	1997
U.S. Fulbright Fellowship	1997-1998
Freeman Medal (outstanding Univ. Arizona graduate)	1997
Sapphire Award (outstanding Univ. Arizona student-athlete)	1997
Outstanding Senior, Department of Mathematics	1997
Flinn Foundation Scholar	1993-1997
National Science Scholar	1993
Presidential Scholar	1993

Publications

Pre-prints

1. Reduced rank regression for neural communication: a tutorial for neuroscientists. Wu B & **JW Pillow** (2025). *arXiv:2512.12467* [q-bio.NC].
2. Inferring learning rules during de novo task learning. Geadah V & **Pillow JW** (2025). *bioRxiv* 2025.09.29.679295.
3. Fast Optimization of Robust Transcriptomics Embeddings using Probabilistic Inference Autoencoder Networks for multi-Omics. Ning Wang, David Turner, Hannah Feinberg, Victor Eduardo Nieto Caballero, Dan Yuan, Nathaniel Scott, Christopher Cardenas, Michael DeBerardine, Shu Dan, Lakme Caceres, Jessica Schembri, Zizhen Yao, Changkyu Lee, **JW Pillow**, Fenna M. Krienen (2025). *bioRxiv* 2025.11.16.686778.
4. Improved inference of latent neural states from calcium imaging data. Keeley S, Zoltowski D, Charles A & Pillow JW (2025). *bioRxiv* 2025.10.17.682993.
5. Learning neural dynamics through instructive signals. Pang R, Arbelaiz J & **Pillow JW** (2025). *bioRxiv* 2025.08.30.673300.
6. Continuous partitioning of neuronal variability. Rupasinghe A, Charles AS & **Pillow JW** (2025). *bioRxiv* 2025.07.23.666404.
7. State-switching navigation strategies in C. elegans are beneficial for chemotaxis. Chen KS, Leifer AM & **Pillow JW** (2025). *arXiv* 2508.00191 [q-bio.NC].
8. Aggression experience and observation promote shared behavioral and neural changes. Iravedra-Garcia JM, Guthman EM, Cuturela LI, Ocasio-Arce EJ, Pillow JW & Falkner AL (2024). *bioRxiv* 2024.12.26.630396.
9. Internal states emerge early during learning of a perceptual decision-making task. Cuturela LI, International Brain Laboratory & **Pillow JW** (2024). *bioRxiv* 2024.11.30.626182.
10. Bridging the gap between the connectome and whole-brain activity in C. elegans. Creamer MS, Leifer AM & **Pillow JW** (2024). *bioRxiv* 2024.09.22.614271.
11. Compact deep neural network models of visual cortex. Cowley BR, Stan PL, **Pillow JW** & Smith MA (2023). *bioRxiv* 2023.11.22.568315.
12. Bayesian efficient coding. Park IM & **Pillow JW** (2020). *bioRxiv* 178418.
13. Recurrent dynamics of prefrontal cortex during context-dependent decision-making. Cohen Z, DePasquale B, Aoi MC & **Pillow JW** (2020). *bioRxiv* 2020.11.27.401539.
14. A comparison of deep learning and linear-nonlinear cascade approaches to neural encoding. Moskovitz TH, Roy NA & **Pillow JW** (2018). *bioRxiv* 463422.

2025

15. Efficient Training of Minimal and Maximal Low-Rank Recurrent Neural Networks. Arora A & **Pillow JW** (2025). *Adv. Neural Information Processing Systems* 39: 1-9.
16. Flexible inference for animal learning rules using neural networks. Liu YH, Geadah V, & **Pillow JW** (2025). *Adv. Neural Information Processing Systems* 39: 1-9.

17. Modeling neural activity with conditionally linear dynamical systems. Geadah V, Nejatbakhsh A, Lipshutz D, **Pillow JW** & Williams AH (2025). *Adv. Neural Information Processing Systems* 39: 1-9.

18. Identifying the factors governing internal state switches during nonstationary sensory decision-making. Mohammadi Z, Ashwood ZC, International Brain Laboratory, & **Pillow JW** (2026). *Nature Communications* 16:11684.

19. Revisiting the high-dimensional geometry of population responses in visual cortex. Pospisil D & **Pillow JW** (2025). *Proc. Nat. Acad. Sci.* 122(45): e2506535122.

20. Flow-field inference from neural data using deep recurrent networks. Kim TD, Luo TZ, Can T, Krishnamurthy K, **Pillow JW** & Brody CD (2025). *Forty-second International Conference on Machine Learning (ICML)*.

21. Brain-wide representations of prior information in mouse decision-making. Findling C, Hubert F, International Brain Lab, ... , **Pillow JW**, … Dayan P, Pouget A (2025). *Nature* 645: 192–200.

22. Inferring internal states across mice and monkeys using facial features. Tlaie A, Abd El Hay MY, Mert B, Taylor R, Ferracci P, Shapcott K, Glukhova M, **Pillow JW**, Havenith MN & Schölvinck MN (2025). *Nature Communications* 16: 5168.

23. Navigation strategies in Caenorhabditis elegans are differentially altered by learning. Chen KS, Sharma AK, **Pillow JW** & Leifer AM (2025). *PLoS Biology* 23(3): e3003005.

24. Inferring neural population codes for Drosophila acoustic communication. Pang R, Baker CA, Murthy M & **Pillow JW** (2025). *Proc. Nat. Acad. Sci.* 122(21): e2417733122.

25. Individual variability of neural computations underlying flexible decisions. Pagan M, Tang VD, Aoi MC, **Pillow JW**, Mante V, Sussillo D & Brody CD (2025). *Nature* 639(8054): 421–429.

2024

26. Disentangling the roles of distinct cell classes with cell-type dynamical systems. Jha A, Gupta D, Brody CD, & **Pillow JW** (2024). *Adv Neur Inf Proc Sys* 37: 1-9.

27. Inferring System and Optimal Control Parameters of Closed-Loop Systems from Partial Observations. Geadah V, Arbelaiz J, Ritz H, Daw ND, Cohen, JD, & **Pillow JW** (2024). IEEE Conf. on Decision and Control. #ThB16.4: 1-8.

28. Pre-existing visual responses in a projection-defined dopamine population explain individual learning trajectories. A Pan-Vazquez*, Y Sanchez Araujo*, B McMannon, M Louka, A Bandi, L Haetzel, International Brain Laboratory, **JW Pillow**, ND Daw, IB Witten (2024). *Current Biology* 34(22): 5349-5358.

29. The fly connectome reveals a path to the effectome. Pospisil D*, Aragon M*, Dorkenwald S, Matsliah A, Sterling AR, Schlegel P, Szi-chieh Y, McKellar CE, Costa M, Eichler K, Jefferis GSXE, Murthy M, & **Pillow JW** (2024). *Nature* 634 (8032): 201–209.

30. Sparse-coding variational auto-encoders. Geadah V*, Barello G*, Greenidge D, Charles AS, & **Pillow JW** (2024). *Neural Computation* 36 (12): 2571–2601.

31. Neural population dynamics underlying evidence accumulation in multiple rat brain regions DePasquale B, Brody CD, & **Pillow JW** (2024). *eLife* 13:e84955.

32. Mapping model units to visual neurons reveals population code for social behaviour Cowley, BR, Calhoun AJ, Rangarajan N, Ireland E, Turner MH, **Pillow JW**, & Murthy M (2024). *Nature* 629 (8014):1100–1108.

33. Cross Talk opposing view: Marr's three levels of analysis are not useful as a framework for neuroscience. **Pillow JW** (2024). *J Physiol*, 602: 1915-1917.

34. Parsing neural dynamics with infinite recurrent switching linear dynamical systems Geadah V, International Brain Lab, & **Pillow JW** (2024). *Intl. Conf. on Learning Representations (ICLR)*. 1-9.

35. Modeling complex animal behavior with latent state inverse reinforcement learning Jha A, Geadah V, & **Pillow JW** (2024). *bioRxiv* 2024.11.13.623515. doi: https://doi.org/10.1101/2024.11.13.623515

36. Modeling state-dependent communication between brain regions with switching nonlinear dynamical systems. Karniol-Tambour O, Zoltowski DM, Diamanti EM, Pinto L, Brody CD, Tank DW, & **Pillow JW** (2024). *Intl. Conf. on Learning Representations (ICLR)*. 1-9

37. Bayesian Active Learning for Discrete Latent Variable Models. Jha A, Ashwood ZC, & **Pillow JW** (2024). *Neural Computation* 36 (3): 437-474.

38. Efficient decoding of large-scale neural population responses with Gaussian-process multiclass regression. Greenidge CD, Scholl B, Yates J, & **Pillow JW** (2024). *Neural Computation* 36(2): 175-226.

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48. Gauthier JL, Koay SA, Nieh EH, Tank DW, **Pillow JW**, & Charles AS. (2022). Detecting and Correcting False Transients in Calcium Imaging. *Nature Methods* 19(4):470–478.

49. Ashwood Z*, Jha A*, & **Pillow JW** (2022). Dynamic inverse reinforcement learning for characterizing animal behavior. *Adv. Neural Information Processing Systems* 35.

50. Valente A, **Pillow JW**, & Ostojic S (2022). Extracting computational mechanisms from neural data using low-rank RNNs. *Adv. Neural Information Processing Systems* 35.

51. Majority of choice-related variability in perceptual decisions is present in early sensory cortex Morais MJ, Michelson C, Chen Y, **Pillow JW**, & Seidmann E (2022). bioRxiv 207357; doi: https://doi.org/10.1101/207357.

2021

52. Wu A, Nastase SA, Baldassano CA, Turk-Brown NB, Norman KA, Engelhardt BE, & **Pillow JW**. (2021). Brain kernel: a new spatial covariance function for fMRI data. *NeuroImage* 245.

53. Jha* A, Morais* MJ, & Pillow JW. (2021). Factor-analytic Inverse Regression for High-dimension, Small-sample Dimensionality Reduction. *Proceedings of the 38th International Conference on Machine Learning (ICML), PMLR* 139:4850-4859.

54. Kim TD, Luo TZ, **Pillow JW**, and Brody CD. (2021). Inferring Latent Dynamics Underlying Neural Population Activity via Neural Differential Equations. *Proceedings of the 38th International Conference on Machine Learning (ICML), PMLR* 139:5551-5561.

55. Song A, Gauthier JL, **Pillow JW**, Tank DW, & Charles AS. (2021). Neural Anatomy and Optical Microscopy (NAOMi) Simulation for evaluating calcium imaging methods. *J. Neurosci. Methods* 358. 109173

56. Roy NA, Bak JH, The International Brain Laboratory, Akrami A, Brody CD, & **Pillow JW** (2021). Extracting the dynamics of behavior in sensory decision-making experiments. *Neuron* 109:1-14.

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57. Keeley SL, Zoltowski DM, Aoi MC, & **Pillow JW** (2020). Modeling statistical dependencies in multi-region spike train data. *Current Opinion in Neurobiology* 65:194-202.

58. Keeley SL, Aoi MC, Yu Y, Smith SL, BR & **Pillow JW** (2020). Identifying signal and noise structure in neural population activity with Gaussian process factor models. *Adv. Neural Information Processing Systems* 33: 13795-13805.

59. Cowley BR & **Pillow JW** (2020). High-contrast "gaudy" images improve the training of deep neural network models of visual cortex. *Adv. Neural Information Processing Systems* 33: 21591-21603.

60. Ashwoood Z*, Roy NA*, Bak JH, The International Brain Laboratory, & **Pillow JW** (2020). Inferring learning rules from animal decision-making. Adv. Neural Information Processing Systems 33: 3442-3453.

61. Rullán Buxó CE & **Pillow JW**. (2019). Poisson balanced spiking networks. PLoS Computational Biology 16:1-27.

62. Aoi MC, Mante V, & **Pillow JW**. (2020). Prefrontal cortex exhibits multi-dimensional dynamic encoding during decision-making. *Nature Neuroscience* 23:1410–1420.

63. Keeley SL, Zoltowski DM, Yu Y, Yates JL, Smith SL, & **Pillow JW**. (2019). Efficient non-conjugate Gaussian process factor models for spike count data using polynomial approximations. *Proceedings of the 37th International Conference on Machine Learning (ICML)*. 119:5177-5186.

64. Zoltowski DM, **Pillow JW**, & Linderman SW. (2020). A general recurrent state space framework for modeling neural dynamics during decision-making. *Proceedings of the 37th International*

Conference on Machine Learning (ICML) 119:5177-5186.

65. Yates JA, Katz LN, Levi AJ, **Pillow JW**, and Huk AC (2020). A simple linear readout of MT supports motion direction-discrimination performance. *J. Neurophysiol.* 123(2):682–694.

2019

66. Latimer KW, Rieke F, & **Pillow JW** (2018). Inferring synaptic inputs from spikes with a conductance-based neural encoding model. *eLife* 8:e47012.
67. Calhoun AJ, **Pillow JW**, & Murthy M. (2019). Unsupervised identification of the internal states that shape natural behavior. *Nature Neurosci.* 22:2040-20149.
68. Panichello MF, DePasquale B, **Pillow JW**, & Buschman TJ (2019). Error-correcting dynamics in visual working memory. *Nature Communications* 10(1): 3366.
69. Wu Anqi, Koyejo O, & **Pillow JW** (2019). Dependent relevance determination for smooth and structured sparse regression. *Journal of Machine learning Research* 20 (89): 1-43.
70. Zoltowski D, Latimer KW, Yates JL, Huk AC, & **Pillow JW** (2019). Discrete stepping and nonlinear ramping dynamics underlie spiking responses of LIP neurons during decision-making. *Neuron* 102(6):1249-1258.
71. Cai MB, Schuck NW, **Pillow JW**, & Niv Y. (2019). Representational structure or task structure? Bias in neural representational similarity analysis and a Bayesian method for reducing bias. *PLoS computational biology*, 15 (5), e1006299
72. **Pillow JW** & Sahani M (2019). Editorial overview: Machine learning, big data, and neuroscience. *Current Opinion in Neurobiology*. 55:iii-iv.

2018

73. Bak Ji Hyun & Pillow JW (2018). Adaptive stimulus selection for multi-alternative psychometric functions with lapses. *Journal of Vision* 18(12):4, 1-25
74. Knöll J, **Pillow JW**, & Huk AC (2018). Lawful tracking of visual motion in humans, macaques, and marmosets in a naturalistic, continuous, and untrained behavioral context. *Proceedings of the National Academy of Sciences* 115(44), E10486-E10494.
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76. Morais M & **Pillow JW** (2018). Power-law efficient neural codes provide general link between perceptual bias and discriminability. *Advances in Neural Information Processing Systems 31,* 5071-5080.
77. Wu, Anqi, Pashkovski S, Datta RS & **Pillow JW** (2018). Learning an olfactory topography from neural activity in piriform cortex. *Advances in Neural Information Processing Systems 31,* 5379-5389.
78. Roy N, Bak JH, Akrami A, Brody C, & **Pillow JW** (2018). Efficient inference for time-varying behavior during learning. *Advances in Neural Information Processing Systems 31,* 5696-5706.
79. Aoi M & **Pillow JW** (2018). Model-based targeted dimensionality reduction for neuronal population data. *Advances in Neural Information Processing Systems 31,* 6689-6698.
80. Charles AS, Park Mijung, Weller JP, Horwitz GD, & **Pillow JW** (2018). Dethroning the Fano Factor: a flexible, model-based approach to partitioning neural variability. *Neural Computation* 30(4):1012-1045.

81. Rokers B, Fulvio J, **Pillow JW**, and Cooper E (2018). Systematic misperceptions of 3D motion explained by Bayesian inference. *Journal of Vision* 18(23):1-23.

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2017

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84. Wu Anqi, Koyejo O, & **Pillow JW** (2017). Gaussian process based nonlinear latent structure discovery in multivariate spike train data *Advances in Neural Information Processing Systems* 30, 3499-3508.

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86. **Pillow JW** & Aoi MC (2017). Is population activity more than the sum of its parts?.*Nature Neuroscience*. 20, 1196-1198. (News & Views on Elsayed & Cunningham 2017).

87. Yates JL, Park Il Memming, Katz LN, **Pillow JW**, & Huk AC (2017). Functional dissection of signal and noise in MT and LIP during decision-making. *Nature Neuroscience*. 20, 1285-1292.

88. Latimer KW, Huk AC, & **Pillow JW** (2017). No cause for pause: new analyses of ramping and stepping dynamics in LIP (Rebuttal to Response to Reply to Comment on Latimer et al. 2015). *bioRxiv*. doi: https://doi.org/10.1101/160994.

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2016

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95. Linderman S, Adams R, & **Pillow JW** (2016). Bayesian latent structure discovery from multi-neuron recordings. *Advances in Neural Information Processing Systems* 29, 2002-2010.

96. Cai MB, Schuck N, **Pillow JW**, & Niv Y (2016). A Bayesian method for reducing bias in neural representational similarity analysis *Advances in Neural Information Processing Systems* 29, 4951-4959.

97. Katz LN*, Yates JL*, **Pillow JW**, & Huk AC (2016). Dissociated functional significance of decision-related activity in the primate dorsal stream. *Nature* 535, 285–288.

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99. **Pillow JW** & Park M (2016). Adaptive Bayesian methods for closed-loop neurophysiology. In *Closed Loop Neuroscience*, ed. A. El Hady, Elsevier: 3-18.

2015

100. Wu A, Park IM, & **Pillow JW** (2015). Convolutional Spike-Triggered Covariance Analysis for Neural Subunit Models. *Advances in Neural Information Processing Systems 28*, 793-801.

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111. Knudson KC, Yates JL, Huk AC, **Pillow, JW** (2014). Inferring sparse representations of continuous signals with continuous orthogonal matching pursuit. *Advances in Neural Information Processing Systems 27*, 1215-1223.

112. Wu A, Park M, Koyejo OO, **Pillow, JW** (2014). Sparse Bayesian structure learning with dependent relevance determination priors. *Advances in Neural Information Processing Systems 27*, 1628-1636.

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2013

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2011

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128.Park M, & **Pillow JW** (2011). Receptive field inference with localized priors. *PLoS Computational Biology 7*(10), 1-16.

129.**Pillow JW,** Ahmadian, Y., & Paninski, L. (2011). Model-based decoding, information estimation, and

change-point detection techniques for multineuron spike trains. *Neural Computation 23*(1), 1-45.

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131. Histed, M. H., & **Pillow JW** (2011). The 8th annual computational and systems neuroscience (Cosyne) meeting. *Neural Systems & Circuits 1*(8), 1-3. (invited meeting review).

2010 and earlier

132. Nirenberg, S., Bomash, I., **Pillow JW, &** Victor J. D. (2010). Heterogeneous response dynamics in retinal ganglion cells: The interplay of predictive coding and adaptation. *Journal of Neurophysiology 103*(6), 3184-3194.

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135. **Pillow JW**, Shlens J, Paninski, L., Sher, A., Litke, A. M., Chichilnisky EJ, & Simoncelli EP (2008). Spatio-temporal correlations and visual signalling in a complete neuronal population. *Nature 454*, 995-999.

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137. **Pillow JW** (2007). Likelihood-based approaches to modeling the neural code. (K. Doya, S. Ishii, A. Pouget, & R. Rao, Eds.) In *Bayesian Brain: Probabilistic Approaches to Neural Coding* (pp. 53-70). Cambridge, MA: MIT press.

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139. **Pillow JW** & Simoncelli EP (2006). Dimensionality reduction in neural models: An information-theoretic generalization of spike-triggered average and covariance analysis. *Journal of Vision*, *6*(4), 414-428.

140. Schwartz, O., **Pillow J. W.**, Rust, N. C., & Simoncelli EP (2006). Spike-triggered neural characterization. *Journal of Vision*, *6*(4), 484-507.

141. Paninski, L., **Pillow JW** & Simoncelli EP (2005). Comparing integrate-and-fire models estimated using intracellular and extracellular data. *Neurocomputing 65-66*(2005), 379-385.

142. **Pillow JW,** Paninski, L., Uzzell, V. J., Simoncelli EP, & Chichilnisky EJ (2005). Prediction and decoding of retinal ganglion cell responses with a probabilistic spiking model. *Journal of Neuroscience 25*(47), 11003-11013.

143. Simoncelli EP, Paninski, L., **Pillow JW**, & Schwartz, O. (2004). Characterization of neural responses with stochastic stimuli. (M Gazzaniga, Ed.) In The *Cognitive Neurosciences III* (pp. 327-338). Cambridge, MA: MIT Press.

144. Paninski, L., **Pillow JW** & Simoncelli EP (2004). Maximum likelihood estimation of a stochastic integrate-and-fire neural encoding model. *Neural Computation, 16*(12), 2533-2561.

145. **Pillow JW**, Paninski, L., & Simoncelli EP (2004) Maximum likelihood estimation of a stochastic

integrate-and-fire neural encoding model. In S. Thrun, L. K. Saul, & B. Schölkopf (Eds.) *Advances in Neural Information Processing Systems 16*. 8 pages. Cambridge, MA: MIT Press.

146. **Pillow JW** & Simoncelli EP (2003). Biases in white noise analysis due to non-Poisson spike generation. *Neurocomputing*, *52-54*(2003), 109-115.

147. **Pillow JW** & Rubin N. (2002). Perceptual completion across the vertical meridian and the role of early visual cortex. *Neuron 33*(5), 805-13.

148. Zemel, R. S. & **Pillow JW** (2002). A probabilistic network model of population responses. (R. Rao, B. Olshausen, & M. Lewicki, Eds.) In *Probabilistic Models of the Brain: Perception and Neural Function* (pp. 223-242). Cambridge, MA: MIT Press.

149. Zemel, R. S. & **Pillow JW** (2000). Encoding multiple orientations in a recurrent network. *Neurocomputing*, *32-33* (June 2000), 609-616.

Research Support

Current Support

- *Adaptive statistical algorithms for learning and control of neural dynamics* (R01 DA056404-04), BRAIN Initiative Award. (PIs: Pillow, Park). 3-year grant. $551K. 9/2022-08/2025.
- *Mechanisms of persistent neural activity* (1RO1EY033064), NIH. (PIs: Huk & Pillow). 5-year grant. $969K. 05/2022-07/2027.
- *State-dependent Decision-making in Brainwide Neural Circuits*. (U19NS123716) U19 NIH-NINDS-BRAIN Initiative Award. lead PI: Paninski. 5-year grant, $1.1M. 08/15/2021-07/31/2026.
- *Statistical approaches to coding and dynamics in neural population activity underlying complex behaviors* - Simons Global Brain Award, Simons Foundation PI: JW Pillow. 6-year grant, $1.28M 7/1/2017-6/30/2025.
- Mechanisms of neural circuit dynamics in working memory and decision-making (U19 NS132720-01). U19 NIH-NINDS BRAIN Initiative Award. PIs: Brody, Fiete, Goldman, Seung, Pillow, Tank, Wang, Witten. 5-year grant, $23.3M, 08/2023-06/2028

Completed Research Support

- *Mechanisms of neural circuit dynamics in working memory and decision-making* (NS104648-01). U19 NIH-NINDS BRAIN Initiative Award. PIs: Brody, Tank, Witten, Wang, Goldman, Seung, Pillow. 5-year grant, $2.1M, 9/1/2017-8/31/2022.
- *Cerebellar determinants of flexible and social behavior on rapid time scales in autism model mice*. R01 MH115750-01, NIH (PIs: Wang, Shaevitz, Pillow). 5-year grant, $631.8K, 09/15/2017-06/30/2022.
- *Dissecting Sensorimotor Pathways Underlying Social Interactions: Models, Circuits, and Behavior*. (R01 NS104899), NIH. 4-year grant. $288K. 01/01/2018-12/31/2022.
- *Real-time statistical algorithms for controlling neural dynamics and behavior* (R01 EB026946), NIH. PIs: IM Park & JW Pillow. 3-year grant, $809K, 09/20/2018-06/30/22.
- *CAREER: Unlocking the neural code with spikes, currents and conductances* (IIS-1150186). Faculty Early Career Development Program Award, National Science Foundation (PI: Pillow). 5-year grant, $433K, 2012-2017.
- *CRCNS: Detailed multi-neuron coding of decisions in the parietal cortex*. (R01-MH099611), NIH/NSF Collaborative Research In Computational Neuroscience (PIs: JW Pillow & AC Huk). 5-year grant,

$1.42M, 2012-2018.

- *Neural time integration underlying higher cognitive function*. (R01EY017366), NIH/NEI (PIs: AC Huk & JW Pillow) 3-year grant. $750K, 2014-2018.
- *Population dynamics across pairs of cortical areas in learning and behavior* - Simons Global Brain Award. 3-year grant (PIs: JW Pillow & SL Smith). $270K, 2014-2017.
- *Simons Collaboration on the Global Brain Research Award*, Simons Foundation (PIs: JW Pillow & SL Smith) 3-year grant, $270K, 2015-2017.
- *Hierarchical methods for decoding high-dimensional brain imaging data* - Princeton Innovation Award: J. Insley Blair Pyne Fund for Innovation. 2-year grant (PIs: JW Pillow, BE Engelhardt, KA Norman). $100K, 2015-2016.
- *McKnight Scholar Award*. $225K, 2012-2016.
- *Sloan Research Fellowship*. $50K. 2011-2013.

Teaching

- *Statistical modeling & analysis of neural data* (NEU 560; grad). Princeton, (2018,2020,2024)
- *Sensation & Perception (*PSY 345 / NEU 325; undergrad). Princeton, (2015,2017,19,22,23,25).
- *Mathematical Tools for Neuroscience* (NEU 314; undergrad). Princeton, (Spring & Fall 2016).
- *Perception* (PSY 323; undergrad). UT Austin, Fall 2009-2013.
- *Topics in Statistics and Neural Coding* - (PSY 394U/ NEU 394P; grad) UT Austin, Spring 2010-2014

Summer Courses:

Co-organizer, *Computational Neuroscience: Vision*. Cold Spring Harbor Lab (July 2014, 2016, 2018, 2022, 2024)

Lecturer, *IBRO-Simons Computational Neuroscience*. Imbizo. Cape Town, South Africa. (Aug 2022).

Lecturer, *Neural Data Science*. Cold Spring Harbor Laboratory. (July, 2015, 2017, 2019).

Lecturer, *Neurotechnologies for Analysis of Neural Dynamics (NAND)*. Princeton University (July 2015-2019).

Lecturer, *Methods in Computational Neuroscience*. Woods Hole, MA (Aug, 2008-2011, 2013-2018).

Lecturer, *Scientific Short Course on Data Science and Data Skills for Neuroscientists*. Society for Neuroscience Meeting, San Diego, Nov, 2016.

Lecturer, *Berkeley summer course in mining and modeling of neuroscience data*. Berkeley, CA (July, 2011,2012,2013,2017).

Lecturer, *Okinawa Computational Neuroscience Course*. Okinawa, Japan. (2004, 2013).

Lecturer, *Advanced Course in Computational Neuroscience*. Freiburg, Germany (Aug, 2008-2010).

Lecturer, *Bayesian Methods in Neuroscience*. PhD Programs in Neuroscience and Computational Biology. Instituto Gulbenkian de Ciencia, Lisbon, Portugal. (June 2009).

Lecturer, *Computational Neuroscience*. PhD Program in Computational Biology. Instituto Gulbenkian de Ciencia, Lisbon, Portugal. (June 2007).

Lecturer, *Dartmouth Summer Institute in Cognitive Neuroscience*, Lake Tahoe, CA (July 2003).

Teaching Assistant, *Computational Neuroscience: Vision*. Cold Spring Harbor, NY (July 2002).

Service

Princeton University

Director of Graduate Studies, PNI (2016-2019, 2020-present).

Executive Committee, Center for Statistics and Machine Learning (2016-present).

Curriculum Subcommittee of the Graduate School (2024-25).

University Fellowships Committee (2022-23).

Data Science Search Committee (2021-22, 2022-23).

PNI Climate & Inclusion Committee (2019)

PNI Curriculum Committee (Oct 2016-present).

PNI Graduate Admissions Committee (2014-present).

PNI Faculty Search Committee (2017 & 2018 & 2019, 2020).

PNI Retreat Co-organizer (2015-2019).

Founder, Computational Neuroscience Journal Club, Princeton University. (2015-present).

Academic Discipline

Advisory Board, International Neuroscience Doctoral Programme at Champalimaud Foundation (2024)

Scientific Advisory Board, Sainsbury Wellcome Centre (2024).

Co-Founder & Co-Editor in Chief: *Neurons, Behavior, Data Analysis & Theory* journal (2018-present).

Senior Area Chair, Neural Information Processing Systems (NeurIPS). 2020-2022.

Area Chair, Neural Information Processing Systems (NIPS) 2010, 2011, 2013, 2016-2019, 2023,2024.

Area Chair, International Conference on Learning Representations (ICLR), 2024,2025.

General Chair (with Nicole Rust), Computational & Systems Neuroscience (Cosyne) Meeting 2013.

Program Chair (with Nicole Rust), Computational & Systems Neuroscience (Cosyne) Meeting 2012.

Program Committee, Computational & Systems Neuroscience (Cosyne) 2010 & 2011

Program Committee, Bernstein Conference on Computational Neuroscience and Neurotechnology (BCCN), 2009

Journal reviewer: Annals of Applied Statistics; IEEE Trans Neur. Sys. & Rehabilitation Engr., eLife, eNeuro, Entropy, J. Comp Neurosci, J. Machine Learning Research (JMLR), J. Neurophys, J. Neurosci, J. Neurosci Methods, J. Vision, Nature, Nature Communications, Nature Neuroscience, Network: Computation in Neural Systems, Neural Computation, Neuron, PLoS Biology, PLoS Computational Biology, PLoS One, Proc. Nat. Academy Sci. (PNAS), Science, Trends in Cognitive Science, Vision Research.

Guest editor: PLoS Computational Biology (2015-present).

Grant reviewer: NSF panelist (Robust Intelligence), NSF ad hoc reviewer (Perception, Action & Cognition), National Agency for Research in France (ANR), The Wellcome Trust, Human Frontier Science Program (HFSP). NIH BRAIN Initiative, Swiss National Science Foundation.

Conference submission reviewer: Neural Information Processing Systems (NIPS) (2002-2015).

Workshop Organizer, "Neural Dynamics and Computation". Cosyne 2017. (with Mikio Aoi & Adam Charles).

Workshop Organizer, "Dimensionality reduction for the analysis and interpretation of high-dimensional neural datasets." Cosyne 2016. (with Mikio Aoi & Adam Charles).

Workshop Organizer, "Scalable Models for High-Dimensional Neural Data". Cosyne 2014. (with Memming Park & Evan Archer).

Workshop Organizer, "The role of natural images in guiding our understanding of visual function" Cosyne 2006. (with Nicole Rust and Eero Simoncelli).

Workshop Organizer, "New Approaches to Characterizing Neural Responses," Cosyne 2005 (with Nicole Rust.)

Member: Society for Neuroscience (2003-present)

Outreach

Neuroscience outreach at University of Puerto Rico. BRAIN COGS Outreach team, Oct 1, 2021.

Neuroscience outreach at Princeton High School, BRAIN COGS Outreach team - presentation about computational and experimental methods for study of decision-making. Nov 15, 2018.

Science on Tap / MolBio Graduate Outreach Program (GMOP) - public talk about neuroscience of taste perception. Sept 24, 2018.

Saturday Morning Math Group - *sponsored outreach program aimed at junior high and high school students, their teachers, and their parents* (http://www.ma.utexas.edu/users/smmg/index.html). Gave 2-hour lecture and problem session on information theory and neural coding, entitled "Information, Bits, Coding, and the Brain". April 13, 2013.

First Bytes - *one-week residential camp program for high school girls, sponsored by UT Austin department of Computer Science* (http://www.cs.utexas.edu/outreach/first-bytes). Presented 1-hour lecture on "Computational neuroscience and neural coding". June 2013 & 2014.