

Jonathan W. Pillow

Education

Ph.D. , New York University, Center for Neural Science <i>Thesis: "Neural coding and the statistical modeling of neuronal responses."</i> <i>Thesis Advisor: Eero Simoncelli</i>	1998-2005
B.A. with honors, <i>summa cum laude</i>. University of Arizona. majors: mathematics and philosophy	1993-1997

Academic Positions

Professor , Princeton Neuroscience Institute & Department of Psychology. 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. Charles AS, Song A, Gauthier JL, **Pillow JW**, & Tank DW. (2019). Neural Anatomy and Optical Microscopy (NAOMi) Simulation for evaluating calcium imaging methods. *bioRxiv* 726174; doi: <https://doi.org/10.1101/726174>.
2. Gauthier JL, Koay SA, Nieh EH, Tank DW, **Pillow JW**, & Charles AS. (2018). Detecting and Correcting False Transients in Calcium Imaging. *bioRxiv* 473470; doi: <https://doi.org/10.1101/473470>.
3. G Barello, AS Charles, & **JW Pillow** (2018). Sparse-coding variational auto-encoders. *bioRxiv* 399246; doi: <https://doi.org/10.1101/399246>.
4. Aoi MC & **Pillow JW** (2017). Scalable Bayesian inference for high-dimensional neural receptive fields. *bioRxiv* 212217; doi: <https://doi.org/10.1101/212217>.
5. Christensen AJ & **Pillow JW** (2017). Running reduces firing but improves coding in rodent higher-order visual cortex. *bioRxiv* 214007; doi: <https://doi.org/10.1101/214007>.
6. Park, Il Memming & **Pillow JW** (2017). Bayesian efficient coding. *bioRxiv* 178418; doi: <https://doi.org/10.1101/178418>.
7. Michelson C, **Pillow JW**, & Seidmann E (2017). Majority of choice-related variability in perceptual decisions is present in early sensory cortex. *bioRxiv*. <https://www.biorxiv.org/content/early/2017/10/22/207357>

2020

8. Roy NA, Bak JH, The International Brain Laboratory, Akrami A, Brody CD, & **Pillow JW** (2020). Extracting the dynamics of behavior in sensory decision-making experiments. *Neuron* (to appear).
9. Keeley SL, Zoltowski DM, Aoi MC, & **Pillow JW** (2020). Modeling statistical dependencies in multi-region spike train data. *Current Opinion in Neurobiology* 65:1-9.
10. 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. *Advances in Neural Information Processing Systems (NeurIPS)* 33.
11. Cowley BR & **Pillow JW** (2020). High-contrast "gaudy" images improve the training of deep neural network models of visual cortex. *Advances in Neural Information Processing Systems (NeurIPS)* 33.
12. Ashwood Z*, Roy NA*, Bak JH, The International Brain Laboratory, & **Pillow JW** (2020). Inferring learning rules from animal decision-making. *Advances in Neural Information Processing Systems (NeurIPS)* 33.
13. Rullán Buxó CE & **Pillow JW**. (2019). Poisson balanced spiking networks. *PLoS Computational Biology* 16:1-27.
14. Aoi MC, Mante V, & **Pillow JW**. (2020). Prefrontal cortex exhibits multi-dimensional dynamic encoding during decision-making. *Nature Neuroscience* 23:1410–1420.
15. 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.

16. Zoltowski DM, Pillow JW, & Linderman SW. (2020). Unifying and generalizing models of neural dynamics during decision-making. *Proceedings of the 37th International Conference on Machine Learning (ICML)* 119:5177-5186.
17. 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

18. Latimer KW, Rieke F, & **Pillow JW** (2018). Inferring synaptic inputs from spikes with a conductance-based neural encoding model. *eLife* 8:e47012.
19. Calhoun AJ, **Pillow JW**, & Murthy M. (2019). Unsupervised identification of the internal states that shape natural behavior. *Nature Neurosci.* 22:2040-20149.
20. Panichello MF, DePasquale B, **Pillow JW**, & Buschman TJ (2019). Error-correcting dynamics in visual working memory. *Nature Communications* 10(1): 3366.
21. 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.
22. 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.
23. 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
24. **Pillow JW** & Sahani M (2019). Editorial overview: Machine learning, big data, and neuroscience. *Current Opinion in Neurobiology.* 55:iii-iv.

2018

25. Bak Ji Hyun & Pillow JW (2018). Adaptive stimulus selection for multi-alternative psychometric functions with lapses. *Journal of Vision* 18(12):4, 1-25
26. 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.
27. Zoltowski D & **Pillow JW** (2018). Scaling the Poisson GLM to massive neural datasets through polynomial approximations. *Advances in Neural Information Processing Systems 31*, 3521-3531.
28. 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.
29. 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.
30. 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.
31. Aoi M & **Pillow JW** (2018). Model-based targeted dimensionality reduction for neuronal population data. *Advances in Neural Information Processing Systems 31*, 6689-6698.
32. 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.

33. 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.

2017

34. Murugan M, Jang HJ, Park M, Miller EM, Cox J, Taliaferro JP, Parker NF, Bhave V, Nectow AR, **Pillow JW**, & Witten IB (2017). Combined social and spatial coding in a descending projection from the prefrontal cortex. *Cell* 171(7): 1663–1677.
35. 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.
36. Weber AI & **Pillow JW** (2017). Capturing the dynamical repertoire of single neurons with generalized linear models. *Neural Computation* 29(12): 3260-3289.
37. **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).
38. Yates JL, Park II 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.
39. 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>.
40. Wu A, Aoi MC, & **Pillow JW** (2017). Exploiting gradients and Hessians in Bayesian optimization and Bayesian quadrature. arXiv:1704.00060

2016

41. Baldassano C, Chen J, Zadbood A, **Pillow JW**, Hasson U, & Norman KA (2016). Discovering event structure in continuous narrative perception and memory. *Neuron* 95(3): 709-721.
42. Song A*, Charles AS*, Koay SA, Gauthier JL, Thiberge SY, **Pillow JW**, & Tank DW (2017). Volumetric Two-photon Imaging of Neurons Using Stereoscopy (vTwINS). *Nature Methods* 14(4): 420-460.
43. Cohen JD, Daw N, Engelhardt B, Hasson U, Li K, Niv Y, Norman KA, **Pillow JW**, Ramadge PJ, Turk-Brown NB, & Willke TL (2017). Computational approaches to fMRI analysis. *Nature Neuroscience* 20: 304-313.
44. Bak JH, Choi JY, Akrami A, Witten IB, & **Pillow JW** (2016). Adaptive optimal training of animal behavior. *Advances in Neural Information Processing Systems* 29, 1947-1955.
45. Linderman S, Adams R, & **Pillow JW** (2016). Bayesian latent structure discovery from multi-neuron recordings. *Advances in Neural Information Processing Systems* 29, 2002-2010.
46. 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.
47. 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.
48. Latimer KL, Yates JL, Meister MLR, Huk AC, & **Pillow JW** (2016). Response to Comment on "Single-trial spike trains in parietal cortex reveal discrete steps during decision-making." *Science* 351(6280): 1406.

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

2015

50. 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.
51. **Pillow JW** (2015). Explaining the especially pink elephant. *Nature Neuroscience* 18: 1435–1436. (News & Views on Wei & Stocker 2015).
52. Latimer KL, Yates JL, Meister MLR, Huk AC, & **Pillow JW** (2015). Single-trial spike trains in parietal cortex reveal discrete steps during decision-making. *Science* 349(6244): 184-187.
53. Williamson RW, Sahani M & **Pillow JW** (2015). The equivalence of information-theoretic and likelihood-based methods for neural dimensionality reduction. *PLoS Comp Biol*, 11(4):1-31.
54. Bonnen K, Burge J, Yates J, **Pillow JW**, & Cormack LC (2015). Continuous psychophysics: Target-tracking to measure visual sensitivity. *Journal of Vision* 15(3):14, 1-16.
55. Latimer KW, Huk AC, & **Pillow JW** (2015). Bayesian inference for latent stepping and ramping models of spike train data. Chapter in *Advanced State Space Methods for Neural and Clinical Data*, Chen, Z, Ed., Cambridge University Press.

2014

56. Park IM, Meister MLR, Huk AC, & **Pillow JW** (2014). Deciphering the code for sensorimotor decision-making in parietal cortex, *Nature Neuroscience* 17, 1395–1403.
57. Archer E, Park I, & **Pillow JW** (2014). Bayesian Entropy Estimation for Countable Discrete Distributions. *Journal of Machine Learning Research* 15 (Oct): 2833–2868.
58. Park M, Weller JP, Horwitz GD, & **Pillow JW** (2014). Bayesian active learning of neural firing rate maps with transformed Gaussian process priors. *Neural Computation* 26(8):1519-1541.
59. Archer, EW, Koster U, **Pillow JW**, & Macke JH (2014). Low-dimensional models of neural population activity in sensory cortical circuits. *Advances in Neural Information Processing Systems 27*, 343-351.
60. Latimer KW, Chichilnisky EJ, Rieke F, **Pillow, JW** (2014). Inferring synaptic conductances from spike trains with a biophysically inspired point process model. *Advances in Neural Information Processing Systems 27*, 954-962.
61. 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.
62. 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.
63. Grabska Barwinska A, & **Pillow JW** (2014). Optimal prior-dependent neural population codes under shared input noise. *Advances in Neural Information Processing Systems 27*, 1880-1888.

2013

64. Archer E, Park I & **Pillow JW** (2013). Bayesian entropy estimation for binary spike train data using parametric prior knowledge. *Advances in Neural Information Processing Systems 26*, 1700-1708.
65. Knudson, K., & **Pillow JW** (2013). Spike train entropy-rate estimation using hierarchical Dirichlet process priors. *Advances in Neural Information Processing Systems 26*, 2076-2084.
66. Park I, Archer E, Priebe NJ, & **Pillow JW** (2013). Spectral methods for neural characterization using

- generalized quadratic models. *Advances in Neural Information Processing Systems* 26, 2454-2462.
67. Park I, Archer E, Latimer K, & **Pillow JW** (2013). Universal models for binary spike patterns using centered Dirichlet processes. *Advances in Neural Information Processing Systems*, 2463-2471.
 68. Park M, & **Pillow JW** (2013). Bayesian inference for low-rank spatiotemporal neural receptive fields. *Advances in Neural Information Processing Systems* 26, 2688-2696.
 69. Archer E, Park I, & **Pillow JW** (2013). Bayesian and quasi-bayesian estimators for mutual information from discrete data. *Entropy* 15(5), 1738-1755.
 70. **Pillow JW**, Shlens J, Chichilnisky EJ, & Simoncelli EP (2013). A model-based spike sorting algorithm for removing correlation artifacts in multi-neuron recordings. *PLoS ONE*. 8(5), 1-14. doi:10.1371/journal.pone.0062123
 71. Park M, Koyejo S, Poldrack RA, Ghosh J, & **Pillow JW** (2013). Bayesian structure learning for functional neuroimaging. *Proceedings of the 16th International Conference on Artificial Intelligence and Statistics (AISTATS), Scottsdale, AZ, USA, 31*, 489-497.

2012

72. Archer E, Pillow JW, & Park I (2012). Bayesian estimation of discrete entropy with mixtures of stick-breaking priors. In P. Bartlett, F. C. N. Pereira, C. J. C. Burges, L. Bottou, & K. Q. Weinberger (Eds.) *Advances in Neural Information Processing Systems* 25, 2024-2032.
73. Park M, & **Pillow JW** (2012). Bayesian active learning with localized priors for fast receptive field characterization. In P. Bartlett, F. C. N. Pereira, C. J. C. Burges, L. Bottou, & K. Q. Weinberger (Eds.) *Advances in Neural Information Processing Systems* 25, 2357-2365.
74. **Pillow JW**, & Scott, J.G. (2012) Fully Bayesian inference for neural models with negative-binomial spiking. In P. Bartlett, F. C. N. Pereira, C. J. C. Burges, L. Bottou, & K. Q. Weinberger (Eds.) *Advances in Neural Information Processing Systems* 25, 1907-1915.
75. Vidne, M., Ahmadian, Y., Shlens J, **Pillow JW**, Kulkarni, J., Litke, A. M., Chichilnisky EJ, Simoncelli, E., & Paninski, L. (2012). Modeling the impact of common noise inputs on the network activity of retinal ganglion cells. *Journal of Computational Neuroscience*, 33(1), 97-121.

2011

76. Park I & **Pillow JW** (2011). Bayesian spike-triggered covariance analysis. In J. Shawe-Taylor, R. Zemel, P. Bartlett, F. Pereira & K. Weinberger (Eds.) *Advances in Neural Information Processing Systems* 24, 1692-1700.
77. Park M, Horwitz, G., & **Pillow JW** (2011). Active learning of neural response functions with Gaussian processes. In J. Shawe-Taylor J, R. Zemel, P. Bartlett, F. Pereira & K. Weinberger (Eds.) *Advances in Neural Information Processing Systems* 24, 2043-2051.
78. Park M, & **Pillow JW** (2011). Receptive field inference with localized priors. *PLoS Computational Biology* 7(10), 1-16.
79. **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.
80. Ahmadian, Y., **Pillow JW**, & Paninski, L. (2011). Efficient Markov chain Monte Carlo methods for decoding neural spike trains. *Neural Computation* 23(1), 46-96.
81. 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

82. 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.

83. **Pillow JW** (2009). Time-rescaling methods for the estimation and assessment of non-Poisson neural encoding models. In Y. Bengio, D. Schuurmans, J. Lafferty, C. Williams and A. Culotta (Eds.) *Advances in Neural Information Processing Systems 22*, 1473-1481.
84. Berkes, P., Wood, F., & **Pillow JW** . (2009). Characterizing neural dependencies with copula models. In D. Koller, D. Schuurmans, Y. Bengio, L. Bottou (eds.) *Advances in Neural Information Processing Systems 21*, 129-136.
85. **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.
86. **Pillow JW** & Latham, P. (2008). Neural characterization in partially observed populations of spiking neurons. In J. C. Platt, D. Koller, Y. Singer, & S. Roweis (Eds.) *Advances in Neural Information Processing Systems 20*, 1161-1168.
87. **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.
88. Paninski, L., **Pillow JW** & Lewi, J. (2007). Statistical models for neural encoding, decoding, and optimal stimulus design. (P. Cisek, T. Drew, & J. F. Kalaska, Eds.) In *Progress in Brain Research* (pp. 93-507). Oxford, UK: Elsevier B. V.
89. **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.
90. Schwartz, O., **Pillow J. W.**, Rust, N. C., & Simoncelli EP (2006). Spike-triggered neural characterization. *Journal of Vision*, 6(4), 484-507.
91. Paninski, L., **Pillow JW** & Simoncelli EP (2005). Comparing integrate-and-fire models estimated using intracellular and extracellular data. *Neurocomputing* 65-66(2005), 379-385.
92. **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.
93. 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.
94. 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.
95. **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.
96. **Pillow JW** & Simoncelli EP (2003). Biases in white noise analysis due to non-Poisson spike generation. *Neurocomputing*, 52-54(2003), 109-115.
97. **Pillow JW** & Rubin N. (2002). Perceptual completion across the vertical meridian and the role of early visual cortex. *Neuron* 33(5), 805-13.
98. 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.

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

Research Support

Current Support

- *Real-time statistical algorithms for controlling neural dynamics and behavior* (R01 EB026946), NIH. PIs: IM Park & JW Pillow. 3-year grant, \$809K, 09/20/2018-06/30/21.
- *Statistical approaches to coding and dynamics in neural population activity underlying complex behaviors* - Simons Global Brain Award, Simons Foundation PI: JW Pillow. 5-year grant, \$106.6K, 7/1/2017-6/30/2022.
- *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.

Completed Research Support

- *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, Spring 2018, Fall 2020.

- *Sensation & Perception* (PSY 345 / NEU 325; undergrad). Princeton, Spring 2015. Fall 2017
- *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)

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).

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

Program Area Chair, Neural Information Processing Systems (NIPS) 2010, 2011, 2013, 2016-2020.

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

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.*, *eNeuro*, *J.*

Comp Neurosci, J. Neurophys, J. Neurosci, J. Neurosci Methods, J. of Vision, Nature, 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.

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 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.