Curriculum Vitae (pdf version)
Liam Paninski
May 23, 2021

Current position

Professor, Departments of Statistics and Neuroscience, Center for Theoretical Neuroscience, Doctoral Program in Neurobiology and Behavior, Zuckerman Mind Brain Behavior Institute, and Kavli Institute for Brain Science, Columbia University.

Co-director, Grossman Center for the Statistics of Mind.

Co-director, Columbia NeuroTechnology Center.

Education

New York University; Ph.D., Neural Science (2003).

Brown University; B.S., Neuroscience (1999).

Previous experience

Assistant (2005-8) and Associate (2008-13) Professor, Department of Statistics, Columbia University.

Senior research fellow, Gatsby Computational Neuroscience Unit, University College London (2004-5).

Postdoctoral fellow, Center for Neural Science, HHMI, NYU (2003).

Papers

Whiteway, M. et al (2021). Semi-supervised sequence modeling for improved behavioral segmentation. Submitted.

Whiteway, M. et al (2021). Partitioning variability in animal behavioral videos using semi-supervised variational autoencoders. Biorxiv 2021.02.22.432309.

Varol, E. et al (2021). Decentralized motion inference and registration of Neuropixels data. ICASSP.

Kim, Y. et al (2021). Nonlinear decoding of natural images from large-scale primate retinal ganglion recordings. Biorxiv 2020.09.07.285742; in press, Neural Computation.

Couto, J. et al (2021). Chronic, cortex-wide imaging of specific cell populations during behavior. arXiv 2010.15191; in press, Nature Protocols.

Chen, S. et al (2021). BARcode DEmixing through Non-negative Spatial Regression (BarDensr). PLoS Comput. Bio. 1008256.

Xie, M. et al (2021). High fidelity estimates of spikes and subthreshold waveforms from 1-photon voltage imaging in vivo. Biorxiv 920256; in press, Cell Reports.

Turner, N. et al (2020). Multiscale and multimodal reconstruction of cortical structure and function. Biorxiv 2020.10.14.338681.

Abe, T. et al (2020). Neuroscience cloud analysis as a service. Biorxiv 146746.

Pakman, A. et al (2020). Attentive clustering processes. arXiv 2010.15191.

Glaser, J. et al (2020). Recurrent Switching Dynamical Systems Models for Multiple Interacting Neural Populations. Neurips.

Nejatbaksh, A. et al (2020). Probabilistic Joint Segmentation and Labeling of C. elegans Neurons. MICCAI

Varol, E. et al (2020). Statistical Atlas of C. elegans Neurons. MICCAI

Nejatbaksh, A. et al (2020). Extracting neural signals from semi-immobilized animals with deformable non-negative matrix factorization. Biorxiv 192120

Wu, A., Buchanan, E.K. et al (2020). Deep Graph Pose: a semi-supervised deep graphical model for improved animal pose tracking. Neurips.

Zhou, D. et al. Disentangled sticky hierarchical Dirichlet process hidden Markov model. ArXiv 2004.03019; ECML-PKDD.

Lee, P. et al (2020). YASS: Yet Another Spike Sorter applied to large-scale multi-electrode array recordings in primate retina. Biorxiv 997924.

Loper, J. et al (2020). General linear-time inference for Gaussian Processes on one dimension. ArXiv 2003.05554.

Zhou, P. et al (2020). EASE: EM-assisted Source Extraction from calcium imaging data. Biorxiv 007468.

Saxena, S. et al (2020). Localized semi-nonnegative matrix factorization (LocaNMF) of widefield calcium imaging data. PLoS Comput. Bio.

Lu, R., Liang, Y. et al (2020). Rapid mesoscale volumetric imaging of neural activity with synaptic resolution. Nature Methods.

Pakman, A. et al (2020). Discrete neural processes. ICML.

Yemini, E. et al (2020). NeuroPAL: A Neuronal Polychromatic Atlas of Landmarks for whole-brain imaging in C. elegans. Cell.

Linderman, S. et al (2019). Hierarchical recurrent state space models reveal discrete and continuous dynamics of neural activity in C. elegans. Biorxiv 621540.

Wei, X., Zhou, D. et al (2019). A zero-inflated gamma model for post-deconvolved calcium imaging traces. NBDT.

Shah, N. et al (2019). Efficient characterization of electrically evoked responses for neural interfaces. Neurips.

Sun, R. et al (2019). Scalable Bayesian inference of dendritic voltage via spatiotemporal recurrent state space models. Neurips.

Batty, E., Whiteway, M. et al (2019). BehaveNet: nonlinear embedding and Bayesian neural decoding of behavioral videos. Neurips.

Abdelfattah, A. et al (2019). Bright and photostable chemigenetic indicators for extended in vivo voltage imaging. Science.

Adam, Y. et al (2019). Voltage imaging and optogenetics reveal behaviour-dependent changes in hippocampal dynamics. Nature.

Lacefield, C., Pnevmatikakis, E., Paninski, L. & Bruno, R. (2019). Reinforcement learning recruits somata and apical dendrites across layers of primary sensory cortex. Cell Reports.

Naka, A. et al (2019). Complementary networks of cortical somatostatin interneurons enforce layer specific control. eLife.

Loper, J. et al (2018+). The Markov link method: a nonparametric approach to combine observations from multiple experiments. Biorxiv 457283.

Buchanan, E.K., Kinsella, I., Ding, Z. et al (2018+). Penalized matrix decomposition for denoising, compression, and improved demixing of functional imaging data. Biorxiv 334706.

Sun, R. and Paninski, L. (2018). Scalable approximate Bayesian inference for particle tracking data. ICML.

Zhou, P. et al (2018). Efficient and accurate extraction of in vivo calcium signals from microendoscopic video data. eLife 7:e28728.

Jimenez, J. et al (2018). Anxiety cells in a hippocampal-hypothalamic circuit. Neuron 97: 670-683.

Berens et al (2018). Community-based benchmarking improves spike inference from two-photon calcium imaging data. PLoS Comput. Bio.

Linderman, S., Mena, G. et al (2018). Reparameterizing the Birkhoff Polytope for Variational Permutation Inference. AISTATS.

International Brain Lab (2017). An international laboratory for systems and computational neuroscience. Neuron 96: 1213-1218.

Yu et al (2017). The central amygdala controls learning in the lateral amygdala. Nature Neuroscience 20: 1680-1685.

Klaus et al (2017). The spatiotemporal organization of the striatum encodes action space. Neuron 95: 1171-1180.

Giovanucci, A. et al (2017). OnACID: Online Analysis of Calcium Imaging Data in Real Time. NIPS.

Parthasarathy, N., Batty, E. et al (2017). Deep Networks for Decoding Natural Images from Retinal Signals. NIPS.

Lee, J. et al (2017). YASS: Yet another spike sorter. NIPS.

Giovanucci et al (2017). Cerebellar granule cells acquire a widespread feedback control signal during motor learning. Nature Neuroscience 20: 727-734.

Buesing et al (2017). A Statistical Model of Shared Variability in the Songbird Auditory System. bioRxiv 113670.

Friedrich, J. et al (2017). Multi-scale approaches for high-speed imaging and analysis of large neural populations. PLoS Comp. Bio. 13: e1005685.

Mena, G. et al (2017). Removing Stimulation Artifacts From Neural Recordings Using Structured Gaussian Processes. PLoS Comp. Bio.

Batty, E. et al (2017). Multilayer Network Models of Primate Retinal Ganglion Cells. ICLR.

Sun, R., Archer, E. & Paninski, L. (2017). Variational inference for super resolution microscopy. AISTATS.

Linderman, S., Miller, A., Adams, R., Blei, D., Paninski, L., Johnson, M. (2017). Recurrent Switching Linear Dynamical Systems. AISTATS.

Pakman, A., Gilboa, D., Carlson, D. & Paninski, L. (2017). Stochastic Bouncy Particle Sampler. ICML.

Rahnama Rad, K., Machado, T. & Paninski, L. (2017). Robust and scalable Bayesian analysis of spatial neural tuning function data. Ann. Applied Stat.

Sumbul, U., Roossien, D., Chen, F., Barry, N., Boyden, E., Cai, D., Cunningham, J. & Paninski, L. (2016). Automated scalable segmentation of neurons from multispectral images. NIPS.

Gao, Y., Archer, E., Paninski, L. & Cunningham, J. (2016). Latent linear-dynamical neural population models through nonlinear embedding. NIPS.

Friedrich, J., Zhou, P. & Paninski, L. (2016). Fast Active Set Method for Online Spike Inference from Calcium Imaging. NIPS; PLoS Comput. Bio. 13: e1005423.

Merel, J., Shababo, B., Naka, A., Adesnik, H. & Paninski, L. (2016). Bayesian methods for event analysis of intracellular currents. Journal of Neuroscience Methods 269: 21-32.

Merel, J., Carlson, D., Paninski, L. & Cunningham, J. (2016). Neuroprosthetic decoder training as imitation learning. PLoS Comp. Bio 12: e1004948.

Carlson, D., Stinson, P., Pakman, A. & Paninski, L. (2016). Partition Functions from Rao-Blackwellized Tempered Sampling. ICML.

Picardo, M., Merel, J., Katlowitz, K., Vallentin, D., Okobi, D, Benezra, S., Clary, R., Pnevmatikakis, E., Paninski, L., and Long, M. (2016). Population-level representation of a temporal sequence underlying skilled behavior. Neuron 90: 866-876.

Gabitto M., Pakman A., Bikoff J., Abbott L., Jessell T. & Paninski, L. (2016). Bayesian sparse regression analysis reveals the extent of spinal V1 interneuron diversity. Cell, 165: 220-33.

Pnevmatikakis, E., Soudry, D., Gao, Y., Machado, T., Merel, J., Pfau, D., Reardon, T., Mu, Y., Lacefield, C., Yang, W., Ahrens, M., Bruno, R., Jessell, T., Yuste, R., Peterka, D. & Paninski, L. (2016). Simultaneous

denoising, deconvolution, and demixing of calcium imaging data. Neuron 89: 285-299.

Yang, W., Miller, J., Carillo-Reid, L. Pnevmatikakis, E., Paninski, L., Yuste, R., & Peterka, D. (2016). Simultaneous multi-plane imaging of neural circuits. Neuron 89: 269-84.

Archer, E., Park, M., Buesing, L., Cunningham, J. & Paninski, L. (2015). Black-box variational inference for state-space models. arXiv:1511.07367

Freeman, J., Field, G., Li, P., Greschner, M., Gunning, D., Mathieson, K., Sher, A., Litke, A., Paninski, L., Simoncelli, E. & Chichilnisky, E.J. (2015). Mapping nonlinear receptive field structure in primate retina at single cone resolution. eLife 4:e05241.

Soudry, D., Keshri, S., Stinson, P., Oh, M.-W., Iyengar, G. & Paninski, L. (2015). Efficient "shotgun" inference of neural connectivity from highly sub-sampled activity data. PLoS Comp. Bio. 11: e1004464.

Machado, T., Miri, A., Pnevmatikakis, E., Paninski, L. & Jessell, T. (2015). Primacy of flexor locomotor pattern revealed by ancestral reversion of motor neuron identity. Cell 162: 338-350.

Merel, J., Pianto, D., Cunningham, J. & Paninski, L. (2015). Encoder-decoder optimization for brain-computer interfaces. PLoS Comp. Bio 11: e1004288.

Buesing, L., Machado, T., Cunningham, J. & Paninski, L. (2014). Clustered factor analysis of multineuronal spike data. NIPS.

Ramirez, A., Pnevmatikakis, E., Merel, J., Miller, K., Paninski, L. & Bruno, R. (2014). Spatiotemporal receptive fields of barrel cortex neurons revealed by reverse correlation of synaptic input. Nat. Neurosci. 17: 866-75.

Mena, G. & Paninski, L. (2014). On quadrature methods for refractory point process likelihoods. Neural Computation 26: 2790-7.

Pnevmatikakis, E., Merel, J., Pakman, A. & Paninski, L. (2014). Bayesian spike inference from calcium imaging data. Asilomar Conf. on Signals, Systems, and Computers.

Pakman, A., Huggins, J., Smith, C. & Paninski, L. (2014). Fast penalized state-space methods for inferring dendritic synaptic connectivity. J. Comput. Neurosci. 36: 415-43

Ramirez, A. & Paninski, L. (2014). Fast generalized linear model estimation via expected log-likelihoods. J. Comput. Neurosci. 36: 215-34.

Shababo, B., Paige, B., Pakman, A. & Paninski, L. (2013). Bayesian inference and online experimental design for mapping neural microcircuits. NIPS.

Pnevmatikakis, E. and Paninski, L. (2013). Sparse nonnegative deconvolution for compressive calcium imaging: algorithms and phase transitions. NIPS.

Pfau, D., Pnevmatikakis, E. & Paninski, L. (2013). Robust learning of low-dimensional dynamics from large neural ensembles. NIPS.

Pakman, A. and Paninski, L. (2013). Auxiliary-variable exact Hamiltonian Monte Carlo samplers for binary distributions. NIPS.

Merel, J., Fox, R., Jebara, T. & Paninski, L. (2013). A multi-agent control framework for co-adaptation in brain-computer interfaces. NIPS.

Smith, C. & Paninski, L. (2013). Computing loss of efficiency in optimal Bayesian decoders given noisy or incomplete spike trains. Network: Computation in Neural Systems 24: 75-98.

Pakman, A. & Paninski, L. (2013). Efficient multivariate truncated normal sampling via exact Hamiltonian Monte Carlo. J. Comput. Graph. Stat. 23.

Pnevmatikakis, E., Rahnama Rad, K., Huggins, J., & Paninski, L. (2013). Fast Kalman filtering and forward-backward smoothing via a low-rank perturbative approach. J. Comput. Graph. Stat. 23.

Sadeghi et al. (2013). Monte Carlo methods for localization of cones given multielectrode retinal ganglion cell recordings. Network: Computation in Neural Systems 24: 27-51.

Doi et al. (2012). Efficient coding of spatial information in the primate retina. Journal of Neuroscience 32: 16256-16264.

Pnevmatikakis, E., Kelleher, K., Chen, R., Josic, K., Saggau, P. & Paninski, L. (2012). Fast nonnegative spatiotemporal calcium smoothing in dendritic trees. PLoS Comp. Bio. 8: e1002569.

Paninski, L., Rahnama Rad, K. & Vidne, M. (2012). Robust particle filters via sequential pairwise reparameterized Gibbs sampling. CISS '12.

Mishchenko, Y. & Paninski, L. (2012) Bayesian compressed sensing approach to reconstructing neural connectivity from subsampled anatomical data. J. Comput. Neuro. 33: 371-88.

Pnevmatikakis & Paninski, L. (2012). Fast interior-point inference in high-dimensional sparse, penalized state-space models. AISTATS '12.

Smith, C., Wood, F. & Paninski, L. (2012). Low rank continuous-space graphical models. AISTATS '12.

Vidne et al. (2012). The impact of common noise on the activity of a large network of retinal ganglion cells. J. Comput. Neuro. 33: 97-121.

Paninski, L., Vidne, M., DePasquale, B., & Ferreira, D. (2012). Inferring synaptic inputs given a noisy voltage trace. J. Comput. Neuro. 33: 1-19.

Huggins, J. & Paninski, L. (2012). Optimal experimental design for sampling voltage on dendritic trees. J. Comput. Neuro. 32: 347-66.

Nazarpour, K., Ethier, C., Paninski, L., Rebesco, J., Miall, C., & Miller, L. (2011). EMG prediction from motor cortical recordings via a non-negative point process filter. IEEE Transactions on Biomedical Engineering 59: 1829-1838.

Rahnama Rad, K. & Paninski, L. (2011). Information rates and optimal decoding in large neural populations. NIPS.

Mishchenko, Y. & Paninski, L. (2011). Efficient methods for sampling spike trains in networks of coupled neurons. Annals of Applied Statistics 5: 1893-1919.

Ahmadian, Y., Packer, A., Yuste, R. & Paninski, L. (2011). Designing optimal stimuli to control neuronal spike timing. J. Neurophys. 106: 1038-1053.

Butts, D., Weng, C., Jin, J. Alonso, J.-M. & Paninski, L. (2011). Temporal precision in the visual pathway through the interplay of excitation and stimulus-driven suppression J. Neurosci. 31: 11313-11327.

Mishchenko, Y., Vogelstein, J. & Paninski, L. (2011). A Bayesian approach for inferring neuronal connectivity from calcium fluorescent imaging data. Annals of Applied Statistics 5: 1229-1261.

Ramirez, A., Ahmadian, Y., Schumacher, J., Schneider, D., Woolley, S. & Paninski, L. (2011). Incorporating naturalistic correlation structure improves spectrogram reconstruction from neuronal activity in the songbird auditory midbrain. J. Neurosci. 31: 3828-42.

Escola, S., Fontanini, A., Katz, D. & Paninski, L. (2011). Hidden Markov models for the inference of neural states and improved estimation of linear receptive fields. Neural Computation 23: 1071-1132.

Calabrese, A. & Paninski, L. (2011). Kalman filter mixture model for spike sorting of non-stationary data. J. Neurosci. Methods 196: 159-169.

Calabrese, A., Schumacher, J., Schneider, D., Woolley, S. & Paninski, L. (2011). A penalized GLM approach for estimating spectrotemporal receptive fields from responses to natural sounds. PLoS One 6(1): e16104.

Lewi, J., Schneider, D., Woolley, S. & Paninski, L. (2011). Automating the design of informative sequences of sensory stimuli. Journal of Computational Neuroscience 30: 181-200 (special issue on methods of information theory in neuroscience research).

Ahmadian, Y., Pillow, J. & Paninski, L. (2011). Efficient Markov Chain Monte Carlo methods for decoding population spike trains. Neural Computation 23: 46-96.

Pillow, J., Ahmadian, Y. & Paninski, L. (2011). Model-based decoding, information estimation, and change-point detection in multi-neuron spike trains. Neural Computation 23: 1-45.

Vogelstein, J., Packer, A., Machado, T., Sippy, T., Babadi, B., Yuste, R. & Paninski, L. (2010). Fast non-negative deconvolution for spike train inference from calcium imaging. J. Neurophys. 104: 3691-3704

Field, G., Gauthier, J., Sher, A. et al. (2010). Functional connectivity in the retina at the resolution of photoreceptors. Nature 467, 673-677.

Rahnama Rad, K. & Paninski, L. (2010). Efficient estimation of two-dimensional firing rate surfaces via Gaussian process methods. Network: Computation in Neural Systems 21: 142-68.

Paninski, L., Ahmadian, Y., Ferreira, D., Koyama, S., Rahnama, K., Vidne, M., Vogelstein, J. & Wu, W. (2010). A new look at state-space models for neural data. Journal of Computational Neuroscience (special issue on statistical analysis of neural data) 29: 107-126.

Koyama, S. & Paninski, L. (2010). Efficient computation of the most likely path in integrate-and-fire and more general state-space models. Journal of Computational Neuroscience 29: 89-105.

Lawhern, V., Wu, W., Hatsopoulos, N. & Paninski, L. (2010). Population neuronal decoding using a generalized linear model with hidden states. J. Neurosci. Methods 189: 267-280.

Babadi, B., Casti, A., Xiao, Y. & Paninski, L. (2010). A generalized linear model of the impact of direct and indirect inputs to the lateral geniculate nucleus. Journal of Vision 10: 22.

Field, R., Lary, J., Cohn, J., Paninski, L. & Shepard, K. (2010). A low-noise, single-photon avalanche diode in standard 0.13 micron complementary metal-oxide-semiconductor process. Applied Physics Letters 97, 211111.

Paninski, L. (2010). Fast Kalman filtering on quasilinear dendritic trees. Journal of Computational Neuroscience 28: 211-28.

Lalor, E., Ahmadian, Y. & Paninski, L. (2009). The relationship between optimal and biologically plausible decoding of stimulus velocity in the retina. Journal of the Optical Society of America A (special issue on ideal observers and efficiency) 26: B25-42.

Vogelstein, J., Watson, B., Packer, A., Yuste, R., Jedynak, B. & Paninski, L. (2009). Spike inference from calcium imaging using sequential Monte Carlo methods. Biophysical Journal 97: 636-655.

Wu, W., Kulkarni, J., Hatsopoulos, N. & Paninski, L. (2009). Neural decoding of goal-directed movements using a linear state-space model with hidden states. IEEE Transactions on Neural Systems and Rehabilitation Engineering 17: 370-378.

Escola, S., Eisele, M., Miller, K. & Paninski, L. (2009). Maximally reliable Markov chains under energy constraints. Neural Computation 21: 1863-912.

Toyoizumi, T., Rahnama Rad, K. & Paninski, L. (2009). Mean-field approximations for coupled populations of generalized linear model spiking neurons. Neural Computation 21, 1203-1243.

Huys, Q. & Paninski, L. (2009). Smoothing of, and parameter estimation from, noisy biophysical recordings. PLOS Computational Biology 5: e1000379.

Lewi, J., Butera, R. & Paninski, L. (2009). Sequential optimal design of neurophysiology experiments. Neural Computation 21: 619-687.

Fudenberg, G. Paninski, L. (2009). Bayesian image recovery for low-SNR dendritic structures. IEEE Trans. Image Processing 18: 471-482.

Lewi, J., Butera, R., Schneider, D., Woolley, S. & Paninski, L. (2008). Designing neurophysiology experiments to optimally constrain receptive field models along parametric submanifolds. NIPS.

Paninski, L. (2008). A coincidence-based test for uniformity given very sparsely-sampled discrete data. IEEE Transactions on Information Theory 54: 4750-4755.

Pillow, J., Shlens, J., Paninski, L., Sher, A., Litke, A., Chichilnisky, E. & Simoncelli, E. (2008). Spatiotemporal correlations and visual signaling in a complete neuronal population. Nature 454: 995-999.

Paninski, L. & Yajima, M. (2008). Undersmoothed kernel entropy estimators. IEEE Transactions on Information Theory 54: 4384-4388.

Kulkarni, J. & Paninski, L. (2008). Efficient analytic computational methods for state-space decoding of goal-directed movements. IEEE Signal Processing Magazine 25 (special issue on brain-computer interfaces): 78-86.

Ahrens, M., Paninski, L. & Sahani, M. (2008). Inferring input nonlinearities in neural encoding models. Network: Computation in Neural Systems 19: 35-67.

Paninski, L., Haith, A. & Szirtes, G. (2008). Differentiable integral equation methods for computing likelihoods in the stochastic integrate-and-fire model. J. Comput. Neuroscience 24: 69-79.

Kulkarni, J. & Paninski, L. (2007). Common-input models for multiple neural spike train data. Network: Computation in Neural Systems 18: 375-407.

Lewi, J., Butera, R. & Paninski, L. (2007). Efficient active learning with generalized linear models. Artificial Intelligence and Statistics (AISTATS) 11.

Townsend, B., Paninski, L. & Lemon, R. (2006). Linear encoding of muscle activity in primary motor cortex and cerebellum. J. Neurophys. 96: 2578-92.

Huys, Q., Ahrens, M. & Paninski, L. (2006). Efficient estimation of detailed single-neuron models. Journal of Neurophysiology 96: 872-890.

Paninski, L. (2006). The spike-triggered average of the integrate-and-fire cell driven by Gaussian white noise. Neural Computation 18: 2592-2616.

Paninski, L. (2006). The most likely voltage path and large deviations approximations for integrate-and-fire neurons. Journal of Computational Neuroscience 21: 71-87.

Pillow, J., Paninski, L., Uzzell, V., Simoncelli, E. & Chichilnisky, E. (2005). Structure and precision of retinal responses analyzed with a noisy integrate-and-fire model. J. Neurosci. 25: 11003-13.

Paninski, L. (2005). Inferring prior probabilities from Bayes-optimal behavior. Advances in Neural Information Processing 18.

Shoham, S., Paninski, L., Fellows, M., Hatsopoulos, N., Donoghue, J. & Normann, R. (2005). Optimal decoding for a primary motor cortical brain-computer interface. IEEE Transactions on Biomedical Engineering 52: 1312-1322.

Paninski, L. (2005). Asymptotic theory of information-theoretic experimental design. Neural Computation 17: 1480-1507.

Paninski, L. (2004). Log-concavity results on Gaussian process methods for supervised and unsupervised learning. Advances in Neural Information Processing 17.

Paninski, L. (2004). Variational minimax estimation of discrete distributions under Kullback-Leibler loss. Advances in Neural Information Processing 17.

Paninski, L. (2004). Maximum likelihood estimation of cascade point-process neural encoding models. Network: Computation in Neural Systems 15: 243-262.

Paninski, L., Pillow, J. & Simoncelli, E. (2004). Comparing integrate-and-fire-like models estimated using intra- and extra-cellular data. Neurocomputing 65: 379-385.

Paninski, L., Pillow, J. & Simoncelli, E. (2004). Maximum likelihood estimation of a stochastic integrate-and-fire neural encoding model. Neural Computation 16: 2533-2561.

Paninski, L. et al. (2004). Superlinear population encoding of dynamic hand trajectory in primary motor cortex. Journal of Neuroscience 24: 8551-8561.

Paninski, L. (2004). Estimating entropy on m bins given fewer than m samples. IEEE Transactions on Information Theory 50: 2200-2203.

Paninski, L., Fellows, M., Hatsopoulos, N. & Donoghue, J. (2004). Spatiotemporal tuning properties for hand position and velocity in motor cortical neurons. Journal of Neurophysiology 91: 515-532.

Hatsopoulos, N., Paninski, L. & Donoghue, J. (2003). Sequential movement representations based on correlated neuronal activity. Experimental Brain Research 149: 478-486.

Serruya, M., Hatsopoulos, N., Paninski, L., Fellows, M. & Donoghue, J. (2003). Robustness of neuroprosthetic decoding algorithms. Biological Cybernetics 88: 219-228.

Paninski, L. (2003). Estimation of entropy and mutual information. Neural Comp. 15: 1191-1253.

Paninski, L. (2003). Convergence properties of three spike-triggered analysis techniques. Network: Computation in Neural Systems 14: 437-464. (Special issue on natural scene statistics and neural codes.)

Paninski, L., Lau, B. & Reyes, A. (2003). Noise-driven adaptation: *in vitro* and mathematical analysis. Neurocomputing 52: 877-883.

Serruya, M., Hatsopoulos, N., Paninski, L., Fellows, M. & Donoghue, J. (2002). Instant neural control of a movement signal. Nature 416: 141-142.

Paninski, L. & Hawken, M. (2001). Stochastic optimal control and the human oculomotor system. Neurocomputing, 38-40: 1511-1517.

Hatsopoulos, N,, Ojakangas, C., Paninski, L. & Donoghue, J. (1998). Information about movement direction obtained from synchronous activity of motor cortical neurons. PNAS 95: 15706-11.

Books

Gerstner, W., Kistler, W., Naud, R. & Paninski, L. (2014). Neuronal dynamics. Cambridge U. Press.

Invited reviews / book chapters

Pnevmatikakis, E. & Paninski, L. (2018). Analysis of functional imaging data at single-cellular resolution. SFN Short Course on Functional, Structural, and Molecular Imaging, and Big Data Analysis.

Paninski, L. & Cunningham, J. (2018). Neural data science: accelerating the experiment-analysis-theory cycle in large-scale neuroscience. Invited review, Current Opinion in Neurobiology; BioRxiv 196949.

International Brain Laboratory (2017). An International Laboratory for Systems and Computational Neuroscience. NeuroView, Neuron 96: 1213-1218.

Yuste, R., Watson, B., Paninski, L., Vogelstein, J. (2009). Imaging action potentials with calcium indicators. Imaging Neurons: A Laboratory Manual, 2ed., eds. Yuste, R. & Konnerth, A., CSHL Press.

Paninski, L., Kass, R., Brown, E. & Iyengar, I. (2008). Statistical analysis of neuronal data via integrate-and-fire models. Stochastic Methods in Neuroscience, eds. Laing, C. & Lord, G., Oxford.

Paninski, L., Pillow, J. & Lewi, J. (2007). Statistical models for neural encoding, decoding, and optimal stimulus design. Computational Neuroscience: Progress in Brain Research, eds. Cisek, P., Drew, T. & Kalaska, J.

Simoncelli, E., Paninski, L., Pillow, J. & Schwartz, O. (2004). Characterization of neural responses with stochastic stimuli. Chapter 23 of The New Cognitive Neurosciences, 3ed, ed. Gazzaniga, M..

Grants

Collaborative Research in Computational Neuroscience, NEI R01 EY018003, co-PI w/ E. Simoncelli and E.J. Chichilnisky, 2006-12.

Gatsby Initiative in Brain Circuitry Pilot Grant, co-PI w/ S. Woolley, 2006-8.

Alfred P. Sloan Research Fellowship, 2007.

NSF Faculty Early Career Development (CAREER) IOS-0641912, 2007-12

McKnight Scholar award, 2008-12.

Collaborative Research in Comput. Neuroscience, NSF IIS-0904353, co-PI w/ R. Yuste, 2009-12.

DARPA award, Reliable Neural-interface Technology program, co-PI w/ B. Pesaran, 2011-3.

MURI award, "Imaging how a neuron computes," co-PI w/ R. Yuste et al., 2012-8.

ONR award, Generalized Factor Analysis, Exact Hamiltonian Monte Carlo Methods, and Spike-and-Slab Models for Non-Gaussian Multivariate Analysis, 2014-.

Collaborative Research in Comput. Neuroscience, NSF IIS-1430239 (Simoncelli and Chichilnisky, co-PIs), 2014-.

Simons Global Brain Research Awards (4) with M. Long, M. Ahrens, J. Freeman, L. Abbott, J. Cunningham, M. Churchland, S. Fusi, W. Freiwald, 2014-.

DARPA SIMPLEX program (Blei, Yuste, Jebara co-PIs), 2015-7.

IARPA MICrONS program (multiple co-PIs), 2015-.

NSF BIGDATA: Collaborative Research: IA: Hardware and software for spike detection and sorting in massively parallel electrophysiological recording systems for the brain (multiple co-PIs), 2015-19.

Google Faculty Award, 2015.

NIH BRAIN Initiative R01 EB22913: Next-Generation Calcium Imaging Analysis Methods, 2016-20.

NIH BRAIN Initiative R21 EY027592: Optimal calcium imaging with shaped excitation, co-PI D. Peterka, 2016-19.

DARPA NESD program (multiple co-PIs), 2016-.

NIH BRAIN Initiative 1U01NS103489-01: High-speed volumetric imaging of neural activity throughout the living brain, co-PI N. Ji et al, 2017-20.

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NSF Neuronex (multiple co-PIs), 2017-.

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Advising

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Other duties

Mindscope advisory council, Allen Institute for Brain Science

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