

Jonathan W. Pillow

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Curriculum Vitae

Positions

Assistant Professor, Departments of Psychology and Neurobiology. The University of Texas at Austin. (Jan 2009-present)

Postdoctoral Fellow, Gatsby Computational Neuroscience Unit, UCL (Oct 2005-2008).

Postdoctoral Fellow, Howard Hughes Medical Institute & NYU. Advisor: E.P. Simoncelli. (Feb-Oct 2005).

Research Assistant, Dr. Rich Zemel. University of Arizona. (1996-97, summer 1998).

Education

New York University, Center for Neural Science (1998-2005), Ph.D. conferred May 2005. Thesis: "Neural coding and the statistical modeling of neuronal responses."

Université Mohammed V, Rabat, Morocco. (U.S. Fulbright Scholar, 1997-1998)

University of Arizona, (1993-1997) B.A. with honors, *summa cum laude*, math and philosophy

Honors and Awards

Royal Society USA/Canada Research Fellowship (2005-08)

Dean's Dissertation Fellowship Award (2003-2004)

Best Student Paper, NIPS 2003

NYU Graduate Forum member (2001-2002)

National Science Foundation Graduate Fellowship (1997-2000)

National Defense Science and Engineering Graduate Fellowship (1997, declined)

NCAA Graduate Fellowship (1997)

U.S. Fulbright Fellowship (1997-1998)

Freeman Medal (1997, outstanding U. Arizona graduate)

Sapphire Award (1997, outstanding U. Arizona student-athlete)

Outstanding Senior, Department of Mathematics (1997)

Flinn Foundation Scholar (1993-97)

National Science Scholar (1993)

Presidential Scholar (1993)

Publications

- Berkes P, Wood F, and Pillow JW. (2009). Characterizing neural dependencies with copula models. *Advances in Neural Information Processing Systems 21* eds. D. Koller, D. Schuurmans, Y. Bengio, L. Bottou. 129-136.
- Pillow JW, Shlens J, Paninski L, Sher A, Litke AM, Chichilnisky EJ, and Simoncelli EP. (2008). Spatio-temporal correlations and visual signaling in a complete neuronal population. *Nature* 454:995-999.
- Pillow JW and Latham, P. (2007) Neural characterization in partially observed populations of spiking neurons. *Advances in Neural Information Processing Systems 20*. eds. J.C. Platt, D. Koller, Y. Singer, S. Roweis. 1161-1168.
- Pillow JW (2007). Likelihood-based modeling of neural responses. *Bayesian Brain: Probabilistic Approaches to Neural Coding*, eds. K Doya, S Ishii, A Pouget & R Rao. MIT press. 53-70.
- Paninski L, Pillow JW, and Lewi J (2007). Statistical models for neural encoding, decoding, and optimal stimulus design. *Computational Neuroscience: Theoretical Insights Into Brain Function*, eds. Cisek, P., Drew, T. & Kalaska, J.
- Pillow JW and 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
- Schwartz O, Pillow JW, Rust NC., and Simoncelli EP (2006). Spike-triggered neural characterization. *Journal of Vision*, 6(4):484-507
- Pillow JW, Paninski L, Uzzell VJ, Simoncelli EP, and Chichilnisky EJ (2005). Prediction and Decoding of Retinal Ganglion Cell Responses with a Probabilistic Spiking Model. *J. Neurosci.* 25:11003-11013.
- Simoncelli EP, Paninski L, Pillow JW, and Schwartz O (2004). Characterization of neural responses with stochastic stimuli. *The Cognitive Neurosciences, 3rd edition*, ed. M Gazzaniga. MIT Press. 327-338
- Paninski L, Pillow JW, and Simoncelli EP (2004). Maximum likelihood estimation of a stochastic integrate-and-fire neural encoding model. *Neural Computation*, 16: 2533-2561.
- Paninski L, Pillow JW, and Simoncelli EP (2004). Comparing integrate-and-fire-like models given intracellular and extracellular data. *Neurocomputing* 65: 379-385.
- Pillow JW, Paninski L, and Simoncelli EP (2004) Maximum Likelihood Estimation of a Stochastic Integrate-and-Fire Neural Model. *Advances in Neural Information Processing Systems*, vol 16, eds. S Thrun, L Saul and B Scholkopf. MIT Press.
- Pillow JW, and Simoncelli EP (2003). Biases in white noise analysis due to non-Poisson spike generation. *Neurocomputing*. 52:109-115.
- Zemel RS and Pillow JW (2002). A Probabilistic Network Model of Population Responses. *Probabilistic Models of the Brain*, eds. R Rao, B Olshausen and M Lewicki. MIT Press.
- Zemel RS and Pillow JW (2000). Encoding multiple orientations in a recurrent network. *Neurocomputing*, 32:609-616.

Invited Talks

- “Understanding stimulus coding and correlation in large neural populations.” Redwood Center for Theoretical Neuroscience, UC Berkeley. host: Rich Zemel. May 20, 2009.
- “Encoding and decoding of neural population spiking activity using a generalized linear model.” Cosyne Workshop on Dimensionality reduction for multi-channel neural recordings. Organizers: B. Yu & J. Cunningham. March 3, 2009.
- “A model-based approach to correlations and multi-neuron signaling of visual information.” Institute of Neuroinformatics, ETH Zurich. Hosts: S. Liu & R. Hahnloser. Sept 19, 2008
- “Assessing the effects of statistical dependencies on neural population coding in the visual pathway.” Cambridge University. host: Máté Lengyel. Sept 3, 2008.
- “Understanding the sensory role of correlated spiking activity using a generalized linear model.” Gatsby Workshop on Neural Coding. Organizer: Bruno Averbeck. June 11, 2008.
- “A model-based approach to correlations and multi-neuronal spike coding.” University of Warwick. host: Magnus Richardson. Nov 27, 2007.
- “Understanding multi-neuronal population codes in primate retina.” Autumn School in Cognitive Neuroscience, Oxford. Organizers: A. Parker, A. Glennerster, & W. Bair. Sept 26, 2007.
- “A model-based approach to correlations and multi-neuronal spike coding.” Inst. for Adaptive and Neural Computation, Univ. Edinburgh. host: Peggy Series. July 10, 2007
- “Assessing the role of correlations in multi-neuronal spike coding.” Max Planck Institute Institute, Tuebingen. host: Matthias Bethge. July 6, 2007.
- “Spike train prediction in multiple neurons: a coupled model of population spike responses in retina.” Quantitative Neuron Modeling: Predicting every spike? EPFL, Lausanne, Switzerland. June 25-26, 2007
- “How does the brain compute?” Plenary Lecture. Statistical Inference in Visual Cortex, Collegium Budapest. Organizers: Jozsef Fiser and Mate Lengyel. June 12, 2007
- “Visual coding in multi-neuronal spike trains.” Statistical Inference in Visual Cortex, Collegium Budapest. Organizers: Jozsef Fiser & Mate Lengyel. June 12, 2007
- “Understanding retinal output with an encoding model of multi-neuron responses.” Goettingen Neurobiology Conference symposium: Do we know what the early visual system computes? Organizers: Matthias Bethge & Christoph Kayser. April 1, 2007.
- “Neural characterization using an information-theoretic generalization of spike-triggered average and covariance analysis.” Cosyne Workshop: Emerging information-theoretic measures and methods in neuroscience. Organizers: M. Gastpar & J. Victor. Feb 26, 2007.
- “Statistical modeling of multi-neuron responses in primate retina.” Oxford University. host: Wyeth Bair. April 6, 2006.
- “A white noise approach to modeling connectivity and correlation in multi-neuron responses.” Columbia Univ. Medical College. host: Brady Butterfield. June 9, 2005.
- “Exploring the neural code with a simple neural encoding model.” University of Rochester. host: Alex Pouget. April 13, 2005.
- “Exploring the neural code with a simple neural encoding model.” Cold Spring Harbor Labs. host: Carlos Brody. April 11, 2005.
- “Exploring the neural code with a simple neural encoding model.” U. Pennsylvania. host: Vijay Balasubramanian. April 6, 2005.
- “Exploring the neural code with a simple neural encoding model.” Courant Institute, NYU. host: John Rinzel. March 29, 2005.

- “Exploring the neural code with a simple neural encoding model.” Brown University, Computer Science Dept. host: Michael Black. Feb 17, 2005.
- “Spike-triggered covariance analysis and modeling of the neural code.” EPFL, Lausanne, Switzerland. host: Wulfram Gerstner. Feb 7, 2005.
- “Estimating a simple neural encoding model and analyzing the neural code.” Gatsby Computational Neuroscience Unit, UC London. host: Maneesh Sahani. Feb 2, 2005.
- “White Noise Methods for Characterizing Neural Adaptation.” workshop on Adaptation in Neuronal Coding, organized by Garrett B. Stanley and Tai Sing Lee, at Neural Information Processing Systems (NIPS), Dec. 2002.

Teaching

- Perception (undergraduate level, UT Austin, Fall 2009)
- Seminar in Cognition and Perception (graduate level, UT Austin, Spring 2009)
- Invited Lecturer, Bayesian Methods in Neuroscience. PhD Programs in Neuroscience and Computational Biology. Instituto Gulbenkian de Ciencia, Lisbon, Portugal. June 2009.
- Invited Lecturer, Methods in Computational Neuroscience. Woods Hole, MA Aug 2008-2009
- Invited Lecturer, Advanced Course in Computational Neuroscience. Freiburg. Aug 2008-2009
- Invited Lecturer, Computational Neuroscience (Oxford Masters course), Jan 2008
- Invited Lecturer, Neuroscience Module: PhD Program in Computational Biology. Instituto Gulbenkian de Ciencia, Lisbon, Portugal. June 2007.
- Guest Lecturer, Theoretical Neuroscience (Gatsby graduate course). Fall 2005 & 2006.
- Guest Lecturer, Mathematical Tools for Neuroscientists. (NYU graduate course), Oct 2005.
- Guest Lecturer, Computational Modeling of Neuronal Systems (NYU math grad course), Oct 05.
- Invited Lecturer, Okinawa Computational Neuroscience Course. Okinawa, Japan. Nov 04.
“Estimating models of neural response from spike trains.”
- Invited Lecturer, Dartmouth Summer Institute in Cognitive Neuroscience, Lake Tahoe, CA, Jul 2003. “Characterization of neural responses with stochastic stimuli.”
- Teaching Assistant, Computational Neuroscience: Vision. (Cold Spring Harbor Summer Course, grad and postdoc) Jul 02.
- Teaching Assistant, Mathematical Tools for Neuroscientists. (NYU grad course) 2000.
- Teaching Assistant, Behavioral and Integrative Neuroscience. (NYU undergrad). 2000.

Service

- Program Committee, Computational and Systems Neuroscience (CoSyNe) (2010)
- Program Committee, Bernstein Conference on Computational Neuroscience and Neurotechnology (BCCN) (2009)
- Review Editor: Frontiers in Computational Neuroscience. (2009-present)
- Journal reviewer: IEEE Trans Neur Sys & Rehabilitation Engr., J Comp Neurosci, J Neurophys, J Neurosci, J of Vision, Nature, Network: Computation in Neural Systems, Neural Computation, PLoS Biology, PLoS Computational Biology, Science
- Conference submission reviewer: Computational Neuroscience (CNS) (2005-06), Neural Information Processing Society (NIPS) (2002-07, 2009).

Other Activities

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

Workshop Organizer, “New Approaches to Characterizing Neural Responses,” Cosyne 2005 (co-organized with Nicole Rust.)

NYU Neuro/Philosophy Discussion Group – organizer (2003-2005).

CNS Student-Postdoc Forum (weekly student journal club) – organizer (2000-2002).

NYU Graduate Forum member (2001-2003).

CSHL summer course participant: Computational Neuroscience: Vision (June 2000).