Maneesh Sahani, Ph. D.

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Academic Positions

Gatsby Computational Neuroscience Unit, University College, London
Reader in Theoretical Neuroscience and Machine Learning 10/09 –
Lecturer 5/04 – 9/09
(Equivalent to Associate and Assistant Professor respectively)

Dept. of Electrical Engineering, Stanford University, Stanford, California
Visiting Assistant Professor 8/04 –

University of California, San Francisco, California
Postdoctoral Fellow 8/02 – 4/04

Gatsby Computational Neuroscience Unit, University College, London
Senior Research Fellow 6/99 – 8/02

Education

California Institute of Technology, Pasadena, California
Ph.D. Computation and Neural Systems 5/99
Dissertation: Latent Variable Models for Neural Data Analysis. Advisors: R. A. Andersen and J. J. Hopfield.

B.S. Physics 6/93

Professional Activities

General Chair, Computational and Systems Neuroscience Conference (COSYNE). 10
Programme Chair, COSYNE. 09
Workshops Chair, Neural Information Processing Systems (NIPS). 08
Co-organizer, Neural Coding Computation and Dynamics meeting. 07
Programme Committee, COSYNE. 07
Programme Committee, NIPS. 04, 06
Member, Board of Directors of the Computational Neuroscience Organization. 03 – 06
Workshops organizer, Computational Neuroscience Meeting. 99 – 03
Co-organizer, Workshop on Neural Dynamics, Gatsby Unit, University College London. 00
Member, Association for Research in Otolaryngology. 05 –
Member, Society for Neuroscience. 95 –

Fellowships and Awards

NIPS2007 Best Student Paper, honourable mention (to Misha Ahrens) Neural Information Processing Systems Conference	07
CCN07 Best Presentation (to Misha Ahrens) Computational Cognitive Neuroscience Meeting	07
ICA2007 Best Student Paper (to Richard Turner) 7th International Conference on Independent Component Analysis and Signal Separation	07
Predoctoral Fellow, Sloan Center for Theoretical Neuroscience	95 – 99
Predoctoral Fellow, Center for Neuromorphic Systems Engineering	95 – 99
Frederic W. Hinrichs, Jr., Memorial Award, Caltech	92

Publications

P. Berkes, R. E. Turner, and M. Sahani. A structured model of video reproduces primary visual cortical organisation. *PLoS Computational Biology*, in press.

G. Santhanam, B. M. Yu, V. Gilja, S. I. Ryu, A. Afshar, M. Sahani, and K. V. Shenoy. Factor-analysis methods for higher-performance neural prostheses. *Journal of Neurophysiology*, 102:1315–1330, 2009.

B. M. Yu, J. P. Cunningham, G. Santhanam, S. I. Ryu, K. V. Shenoy, and M. Sahani. Gaussian-process factor analysis for low-dimensional single-trial analysis of neural population activity. *Journal of Neurophysiology*, 102:614–635, 2009.

B. M. Yu, J. P. Cunningham, G. Santhanam, S. I. Ryu, K. V. Shenoy, and M. Sahani. Gaussian-process factor analysis for low-dimensional single-trial analysis of neural population activity. In D. Koller, D. Schuurmans, Y. Bengio, and L. Bottou, eds., *Advances in Neural Information Processing Systems*, vol. 21, pp. 1881–1888, Cambridge, MA, 2009. MIT Press.

M. B. Ahrens, J. F. Linden, and M. Sahani. Nonlinearities and contextual influences in auditory cortical responses modeled with multilinear spectrotemporal methods. *Journal of Neuroscience*, 28(8):1929–1942, 2008.

M. B. Ahrens, L. Paninski, and M. Sahani. Inferring input nonlinearities in neural encoding models. *Network: Computation in Neural Systems*, 19(1):35–67, 2008.

M. B. Ahrens and M. Sahani. Inferring elapsed time from stochastic neural processes. In J. C. Platt, D. Koller, Y. Singer, and S. Roweis, eds., *Advances in Neural Information Processing Systems*, vol. 20, Cambridge, MA, 2008. MIT Press.

P. Berkes, R. E. Turner, and M. Sahani. On sparsity and overcompleteness in image models. In J. C. Platt, D. Koller, Y. Singer, and S. Roweis, eds., *Advances in Neural Information Processing Systems*, vol. 20, Cambridge, MA, 2008. MIT Press.

G. B. Christianson, M. Sahani, and J. F. Linden. The consequences of response nonlinearities for interpretation of spectrotemporal receptive fields. *Journal of Neuroscience*, 28(2):446–455, 2008.

J. P. Cunningham, B. M. Yu, K. V. Shenoy, and M. Sahani. Inferring neural firing rates from spike trains using Gaussian processes. In J. C. Platt, D. Koller, Y. Singer, and S. Roweis, eds., *Advances in Neural Information Processing Systems*, vol. 20, Cambridge, MA, 2008. MIT Press.

J. P. Cunningham, K. V. Shenoy, and M. Sahani. Fast Gaussian process methods for point process intensity estimation. In *ICML '08: Proceedings of the 25th international conference on Machine learning*, pp. 192–199, Helsinki Finland, 2008. Omni Press.

J. Lücke and M. Sahani. Maximal causes for non-linear component extraction. *Journal of Machine Learning Research*, 9:1227–1267, 2008.

G. Santhanam, B. M. Yu, V. Gilja, S. I. Ryu, A. Afshar, M. Sahani, and K. V. Shenoy. A factor-analysis decoder for high-performance neural prostheses. In *ICASSP'08: Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing, 2008*, pp. 5208–11, 2008.

R. E. Turner and M. Sahani. Modeling natural sounds with modulation cascade processes. In J. C. Platt, D. Koller, Y. Singer, and S. Roweis, eds., *Advances in Neural Information Processing Systems*, vol. 20, Cambridge, MA, 2008. MIT Press.

B. M. Yu, J. P. Cunningham, K. V. Shenoy, and M. Sahani. Neural decoding of movements: From linear to nonlinear trajectory models. In *Neural Information Processing – ICONIP 2007, Proceedings, Part I*, Lecture Notes in Computer Science, pp. 586–595. Springer, 2008.

L. Whiteley and M. Sahani. Implicit knowledge of visual uncertainty guides decisions with asymmetric outcomes. *Journal of Vision*, 8(3):2, 1–15, 2008.

M. M. Churchland, B. M. Yu, M. Sahani, and K. V. Shenoy. Techniques for extracting single-trial activity patterns from large-scale neural recordings. *Current Opinion in Neurobiology*, 17(5):609–618, 2007.

J. Lücke and M. Sahani. Generalized softmax networks for non-linear component extraction. In J. Marques de Sá, L. A. Alexandre, W. Duch, and D. Mandic., eds., *Artificial Neural Networks – ICANN 2007 Proceedings, Part I*, Lecture Notes in Computer Science, pp. 657–667, Berlin, 2007. Springer.

R. E. Turner and M. Sahani. Probabilistic amplitude demodulation. In *Independent Component Analysis and Signal Separation*, Lecture Notes in Computer Science, pp. 544–551. Springer, 2007.

R. E. Turner and M. Sahani. A maximum-likelihood interpretation for slow feature analysis. *Neural Computation*, 19(4):1022–1038, 2007.

S. Prince, J. Aghajanian, U. Mohammed, and M. Sahani. Latent identity variables: Biometric matching without explicit identity estimation. In *Advances in Biometrics, International Conference, ICB 2007, Seoul, South Korea, August 27-29, 2007, Proceedings*, Lecture Notes in Computer Science, pp. 424–434, Berlin, 2007. Springer.

B. M. Yu, C. Kemere, G. Santhanam, A. Afshar, S. I. Ryu, T. H. Meng, M. Sahani, and K. V. Shenoy. Mixture of trajectory models for neural decoding of goal-directed movements. *Journal of Neurophysiology*, 97(5):3763–3780, 2007.

B. M. Yu, A. Afshar, G. Santhanam, S. I. Ryu, K. V. Shenoy, and M. Sahani. Extracting dynamical structure embedded in neural activity. In Y. Weiss, B. Schölkopf, and J. Platt, eds., *Advances in Neural Information Processing Systems*, vol. 18, pp. 1545–1552, Cambridge, MA, 2006. MIT Press.

K. Sekihara, M. Sahani, and S. S. Nagarajan. Localization bias and spatial resolution of adaptive and non-adaptive spatial filters for MEG source reconstruction. *Neuroimage*, 25(4):1056–67, 2005.

K. Sekihara, M. Sahani, and S. S. Nagarajan. A simple nonparametric statistical thresholding for MEG spatial-filter source reconstruction images. *Neuroimage*, 27(2):368–76, 2005.

M. Sahani. A biologically plausible algorithm for reinforcement-shaped representational learning. In S. Thrun, L. Saul, and B. Schoelkopf, eds., *Advances in Neural Information Processing Systems*, vol. 16, Cambridge, MA, 2004. MIT Press.

M. Sahani and S. S. Nagarajan. Reconstructing MEG sources with unknown correlations. In S. Thrun, L. Saul, and B. Schoelkopf, eds., *Advances in Neural Information Processing Systems*, vol. 16, Cambridge, MA, 2004. MIT Press.

K. Sekihara, M. Sahani, and S. S. Nagarajan. Bootstrap-based statistical thresholding for MEG source reconstruction images. In *Proceedings of the 26th Annual International Conference of the IEEE EMBS*, vol. 2, pp. 1018–1021, 2004.

G. Santhanam, M. Sahani, S. Ryu, and K. V. Shenoy. An extensible infrastructure for fully automated spike sorting during online experiments. In *Proceedings of the 26th Annual International Conference of the IEEE EMBS*, vol. 6, pp. 4380–4384, 2004.

M. Sahani and P. Dayan. Doubly distributional population codes: Simultaneous representation of uncertainty and multiplicity. *Neural Computation*, 15(10):2255–2279, 2003.

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2003.

M. Sahani and J. F. Linden. Evidence optimization techniques for estimating stimulus-response functions. In S. Becker, S. Thrun, and K. Obermayer, eds., *Advances in Neural Information Processing Systems*, vol. 15, pp. 301–308, Cambridge, MA, 2003. MIT Press.

M. Sahani and J. F. Linden. How linear are auditory cortical responses? In S. Becker, S. Thrun, and K. Obermayer, eds., *Advances in Neural Information Processing Systems*, vol. 15, pp. 109–116, Cambridge, MA, 2003. MIT Press.

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C. Kemere, M. Sahani, and T. Meng. Robust neural decoding of reaching movements for prosthetic systems. In *Proceedings of the 25th Annual International Conference of the IEEE EMBS*, vol. 3, pp. 2079–2082, 2003.

B. Pesaran, J. S. Pezaris, M. Sahani, P. P. Mitra, and R. A. Andersen. Temporal structure in neuronal activity during working memory in macaque parietal cortex. *Nature Neuroscience*, 5(8):705–816, 2002.

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M. Sahani. *Latent Variable Models for Neural Data Analysis.* PhD thesis, California Institute of Technology, Pasadena, California, 1999.

M. Wehr, J. S. Pezaris, and M. Sahani. Simultaneous paired intracellular and tetrode recordings for evaluating the performance of spike sorting algorithms. *Neurocomputing*, 26–27:1061–1068, 1999.

J. S. Pezaris, M. Sahani, and R. A. Andersen. Response correlations in parietal cortex. *Neurocomputing*, 26–27:471–476, 1999.

M. Sahani, J. S. Pezaris, and R. A. Andersen. On the separation of signals from neighboring cells in tetrode recordings. In M. I. Jordan, M. J. Kearns, and S. A. Solla, eds., *Advances in Neural Information Processing Systems*, vol. 10, Cambridge, MA, 1998. MIT Press.

M. Sahani, J. S. Pezaris, and R. A. Andersen. Extracellular recording from multiple neighboring cells: A maximum-likelihood solution to the spike-separation problem. In J. M. Bower, ed., *Computational Neuroscience: Trends in Research, 1998.* Plenum, 1998.

J. S. Pezaris, M. Sahani, and R. A. Andersen. Extracellular recording from multiple neighboring cells: Correlation analysis of spike trains in parietal cortex. In J. M. Bower, ed., *Computational Neuroscience: Trends in Research, 1998.* Plenum, 1998.

J. S. Pezaris, M. Sahani, and R. A. Andersen. Tetrodes for monkeys. In J. M. Bower, ed., *Computational Neuroscience: Trends in Research, 1997.* Plenum, 1997.