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| BIOGRAPHICAL SKETCH Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2. Follow this format for each person.  **DO NOT EXCEED FOUR PAGES.** | | | | |
|  | | | | |
| NAME  Ying Nian Wu, Ph.D. | | POSITION TITLE  Professor of Statistics | | |
| eRA COMMONS USER NAME (credential, e.g., agency login)  ynwu | |
| EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)* | | | | |
| INSTITUTION AND LOCATION | DEGREE  *(if applicable)* | | MM/YY | FIELD OF STUDY |
| Harvard University | Ph.D. | | 1996 | Statistics |
| Harvard University | A.M. | | 1993 | Statistics |

A. Personal Statement

My primary research focus is on statistical modeling and learning, with applications in image analysis and computer vision. In particular, I have been working on developing generative models and associated learning algorithms for representing and recognizing patterns in natural images. I have also worked on bioinformatics such as the modeling and analysis of ChIP-chip data, which is a precursor of the ChIP-seq data. My research has been supported by NSF, ONR, DARPA etc. My experience on machine learning, image analysis, and high throughput bioinformatics data make me suited for consulting for this project.

B. Positions and Honors

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| --- | --- |
| 2006-now | Professor, Department of Statistics, UCLA |
| 2001-2006 | Associated Professor, Department of Statistics, UCLA |
| 1999-2001 | Assistant Professor, Department of Statistics, UCLA |
| 1997-1999 | Assistant Professor, Department of Statistics, University of Michigan |

Honorable Mention for David Marr Prize, International Conference of Computer Vision, 2007.

Honorable Mention for David Marr Prize, International Conference of Computer Vision, 1999.

Winner of Student Paper Competition, Statistical Computing Section, American Statistical Association, 1995.

C. Selected Peer-reviewed Publications

1. Chernoff, H. and Wu, Y. N. (1994) Bounds on inconsistent inferences for sequences of trials with varying probabilities. Probability, Statistics and Optimisation, Ed. F. P. Kelly. John Wiley & Sons. 351-366.
2. Wu, Y. N. (1995) Random shuffling: a new approach to matching problem. Student Paper Competition Session, Statistical Computing Section, Proceedings of American Statistical Association, 69-74.
3. Rubin, D. B. and Wu, Y. N. (1997) Modeling schizophrenic behavior using general mixture components. Biometrics, 53, 243-261.
4. Zhu, S. C., Wu, Y. N., and Mumford, D. B. (1997) Filter, Random field, And Maximum Entropy (FRAME): towards a unified theory for texture modeling. International Journal of Computer Vision, 27, 107-126.
5. Zhu, S. C., Wu, Y. N., and Mumford, D. B. (1998) Minimax entropy principle and its application to texture modeling. Neural Computation, 9, 1627-1660.
6. Liu, C., Rubin, D. B., and Wu, Y. N. (1998) Parameter expansion to accelerate EM - the PX-EM algorithm. Biometrika, 85, 755-770.
7. Liu, J. S. and Wu, Y. N. (1999) Parameter expansion for data augmentation. Journal of the American Statistical Association, 94, 1264-1274.
8. Wu, Y. N., Zhu, S. C., and Liu, X. (1999) Equivalence of Julesz and Gibbs texture ensembles. Proceedings of International Conference of Computer Vision, 1025-1032.
9. Matthysse S., Levy D. L., Wu Y. N., Rubin D. B., Holzman P. (1999) Intermittent degradation in performance in schizophrenia, Schizophrenic Research, 40, 131-146.
10. Zhu, S. C., Liu, X., and Wu, Y. N. (2000) Exploring texture ensembles by efficient Markov chain Monte Carlo - towards a `trichromacy' theory of texture. IEEE Pattern Analysis and Machine Intelligence, 22, 554-569.
11. Wu, Y. N., Zhu, S. C., and Liu, X. (2000) Equivalence of Julesz ensembles and FRAME models. International Journal of Computer Vision, 38, 245-261.
12. Pinheiro J., Liu, C., and Wu, Y. N. (2001) Efficient algorithms for robust estimation in linear mixed-effects models using the multivariate t-distribution. Journal of Computational and Graphical Statistics, 10, 249-276.
13. Yuille, A. L., Coughlan, J., Wu, Y. N., Zhu, S. C. (2001) Order parameters for detecting target curves in images: when does high level knowledge help? International Journal of Computer Vision. 41, 9-33.
14. Soatto, S., Doretto, G., and Wu, Y. N. (2001) Dynamic textures. Proceedings of International Conference of Computer Vision, 439-447.
15. Saisan, P., Doretto, G., Wu, Y. N., Soatto, S. (2001) Dynamic texture recognition. Proceedings of Computer Vision and Pattern Recognition.
16. Wu, Y. N., Zhu, S. C., and Guo, C. (2002) Statistical modeling of texture sketch. Proceedings of European Conference of Computer Vision, 240-254.
17. Zhu, S. C., Guo, C., Wu, Y. N. and Wang, Y. (2002) What are textons? Proceedings of European Conference of Computer Vision, 793-807.
18. Doretto, G., Chiuso, A, Wu, Y. N. and Soatto, S., (2003) Dynamic textures. International Journal of Computer Vision. 51, 91-109.
19. Guo, C., Zhu, S. C., and Wu, Y. N. (2003) Visual learning by integrating descriptive and generative models. International Journal of Computer Vision. 53, 5-29.
20. Guo, C., Zhu, S. C., and Wu, Y. N. (2003) A mathematical theory of primal sketch and sketchability. Proceedings of International Conference of Computer Vision. 1228-1235.
21. Wu, Y. N., Guo, C. E., Zhu, S. C. (2004) Perceptual scaling. Applied Bayesian Modeling and Causal Inference from an Incomplete Data Perspective, Ed. Gelman and Meng. John Wiley & Sons.
22. Guo, C., Wu, Y. N., and Zhu, S. C. (2004) Information scaling laws in natural scenes. Proceedings of 2nd Workshop on Generative Model Based Vision. Washington, DC.
23. Kim, T. H, Barrera, L. O., Zheng, M., Qu, C., Singer, M. A., Richmand, T. A., Wu, Y. N. N., Green, R. G. and Ren, B. (2005) A High-resolution map of active promoters in the human genome, Nature, 436, 876-880.
24. Xing, Y. Yu, T., Wu, Y. N., Roy, M., Kim, J. and Lee C. (2006), An expectation-maximization algorithm for probabilistic reconstructions of full-length isoforms from splice graphs. Nucleic Acid Research, 34, 3150-3160.
25. Chen, R. B. and Wu, Y. N. (2007) A null-space algorithm for overcomplete blind source separation. Computational Statistics and Data Analysis, 51, 5519-5536.
26. Guo, C., Zhu, S. C. and Wu, Y. N. (2007) Primal sketch: integrating structure and texture. Computer Vision and Image Understanding, 106, 5-19.
27. Li, J., Yang. X., Wu, Y. N. and Shoptaw, S. (2007) A random-effect Markov transition model for Poisson-distributed repeated measures with nonignorable missing values. Statistics in Medicine, 26, 2519-2532.
28. Zheng, M., Barrera, L. O., B. Ren, and Wu, Y. N. (2007) ChIP-chip: data, model, and analysis. Biometrics, 63, 787-796.
29. Wu, Y. N., Li, J., Liu, Z., and Zhu, S. C. (2007) Statistical principles in image modeling. Technometrics, 49, 249-261.
30. Wu, Y. N., Si, Z., Fleming, C., and Zhu, S. C. (2007) Deformable template as active basis. Proceedings of International Conference of Computer Vision.
31. Wu, Y. N., Guo, C. , and Zhu, S. C. (2008) From information scaling to regimes of statistical models. Quarterly of Applied Mathematics, 66, 81-122.
32. Si, Z., Gong, H., Wu, Y. N., and Zhu, S. C. (2009) Learning mixed template for object recognition. Proceedings of Computer Vision and Pattern Recognition.
33. Wu, Y. N., Si, Z., Gong, H. and Zhu, S. C. (2010) Learning active basis model for object detection and recognition. International Journal of Computer Vision, 90, 198-235.
34. Si, Z., Gong, H., Zhu, S. C., and Wu, Y. N. (2010) Learning active basis models by EM-type algorithms. Statistical Science, 25, 458–475.
35. Si, Z. and Wu, Y. N. (2010) Wavelet coding, active basis, and shape script --- a tour in the sparse land. ACM SIGMM International Conference on Multimedia Information Retrieval, Special session on Statistical Modeling and Learning for Multimedia.
36. Chen, R. B., Chu, C. H., Lai, T. Y., and Y. N. Wu (2011) Stochastic matching pursuit for Bayesian variable selection. Statistics and Computing, 21, 247-259.
37. Hu, W. , Wu, Y. N., and Zhu, S. C. (2011) Image representation by active curves. Proceedings of International Conference of Computer Vision.
38. Dai. J., Wu, Y. N., Zhou, J., and Zhu, S. C. (2013) Co-segmentation and co-sketch by unsupervised learning. Proceedings of International Conference of Computer Vision.
39. Yi, H., Hu, W., Zi, Z., Zhu, S. C., and Wu, Y. N. (2013) Unsupervised learning of compositional sparse code for natural images. Quarterly of Applied Mathematics.
40. Xie, J., Hu, W., Zhu, S. C., and Wu, Y. N. (2014) Learning inhomogeneous FRAME models for object patterns. Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR).
41. Dai, J., Hong, Y., Hu, W., Zhu, S. C., and Wu, Y. N. (2014) Unsupervised learning of dictionaries of hierarchical compositional models. Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR).

D. Research Support

Ongoing Research Support

DMS 1310391 (Wu) 07/01/13-06/30/15

NSF

*Learning Compositional Sparse Coding Models for Natural Images*

The goal of this project is to develop unsupervised learning method for learning hierarchical compositional models for natural image patterns.

Role: Principal Investigator

N00014-10-1-0933 (Zhu)                                                     08/01/10-07/31/14

ONR

*Knowledge Representation, Reasoning and Learning for Understanding Scenes and Events*

This is a multi-university research initiative (MURI) project sponsored by ONR. The goal of this project is to develop statistical models and algorithms for knowledge representation, reasoning and learning for understanding scenes and events.

Role: Co-Investigator

N00014-10-1-0933 (Zhu)                                                     08/01/11-07/31/14

DARPA

*Sensor Exploitation and Execution on a Unified Foundation*

The goal of this project is to study the mathematical foundation of sensor exploitation and execution in computer vision.

Role: Co-Investigator

Completed Research Support

DMS 1007889 (Wu) 07/01/10-06/30/13

NSF

*Statistical Modeling and Learning in Vision*

The goal of this project is to develop statistical models and associated learning and inference algorithms for object and texture patterns in natural scenes.

Role: Principal Investigator

DMS 0707055 (Wu) 07/01/07-12/31/10

NSF

*From Information Scaling to Regimes of Statistical Models of Natural Image Patterns*

The goal of this project is to study the change of statistical properties of natural images under scaling, and develop statistical models for different entropy regimes.

Role: Principal Investigator