

**University of California, Irvine
Statistics Seminar**

***Cooperative Learning of Deep Energy-based Model and Latent
Variable Model via MCMC Teaching***

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(Bldg. #314 on campus map)**

We propose a cooperative learning algorithm to train both the deep energy-based model and the deep latent variable models jointly. The learning algorithm interweaves the maximum likelihood algorithms for learning the two models, and each iteration consists of the following two steps: (1) Modified contrastive divergence for energy-based model: The learning of the energy-based model is based on the contrastive divergence, but the finite-step MCMC sampling of the model is initialized from the synthesized examples generated by the latent variable model instead of being initialized from the observed examples. (2) MCMC teaching of the latent variable model: The learning of the latent variable model is based on how the MCMC in (1) changes the initial synthesized examples generated by the latent variable model, where the latent variables that generate the initial synthesized examples are virtually known so that the learning is essentially supervised. Our experiments show that the cooperative learning algorithm can learn realistic models of images. Based on joint work with Jianwen Xie, Yang Lu, Ruiqi Gao, and Song-Chun Zhu.

SHORT BIO: Ying Nian Wu received his Ph.D. degree in statistics from Harvard in 1996. He was an assistant professor from 1997 to 1999 in Department of Statistics, University of Michigan. He joined University of California, Los Angeles (UCLA) in 1999, and is currently a professor in Department of Statistics, UCLA. His research interests include statistical modeling, computing and learning, with applications in computer vision.