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## Zhe Gan

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### Research Interests

I focus on designing efficient and scalable Bayesian inference algorithms for deep learning models with applications in natural language processing and computer vision.

### Education

- Duke University, Durham, NC  
Ph.D., Electrical and Computer Engineering 09/2013 - present
- Peking University, Beijing, China  
M.S., Electrical Engineering 09/2010 - 07/2013  
B.S., Electrical Engineering 09/2006 - 07/2010

### Experience

- **Information Initiative at Duke (iiD)** 09/2013 - present  
Research Assistant. Advisor: Prof. Lawrence Carin
  - (i) Developing deep generative models for image analysis, topic modeling and sequence modeling
  - (ii) Designing stochastic gradient variational inference algorithms and stochastic gradient MCMC methods for scalable Bayesian inference
  - (iii) Nonparametric discriminative factor modeling for gene-expression analysis
- **Microsoft Research Redmond** 05/2016 - 08/2016  
Research Intern. Advisor: Xiaodong He, Jianfeng Gao, Li Deng, Ph.D.
  - (i) image captioning: using deep learning techniques to improve the state-of-the-art of image and video captioning.
  - (ii) deep conflation: using deep learning techniques to implement conflation for business data analytics.
- **Adobe Research** 06/2015 - 09/2015  
Data Scientist Intern. Advisor: Hung Bui, Ph.D.  
Recurrent neural networks (RNN) for NLP applications, including sentence classification, sentence retrieval and sentence generation

### Publications

#### Arxiv

1. Y. Pu, **Z. Gan**, R. Henao, C. Li, S. Han and L. Carin "Stein Variational Autoencoder", *arXiv preprint arXiv:1704.05155*
2. Y. Pu, M. R. Min, **Z. Gan** and L. Carin "Adaptive Feature Abstraction for Translating Video to Language", *arXiv preprint arXiv:1611.07837*
3. **Z. Gan**, Y. Pu, R. Henao, C. Li, X. He and L. Carin "Unsupervised Learning of Sentence Representations using Convolutional Neural Networks", *arXiv preprint arXiv:1611.07897*

#### Referred Conference

1. **Z. Gan**, C. Li, C. Chen, Y. Pu, Q. Su and L. Carin "Scalable Bayesian Learning of Recurrent Neural Networks for Language Modeling", *Association for Computational Linguistics (ACL) 2017*

2. **Z. Gan**, C. Gan, X. He, Y. Pu, K. Tran, J. Gao, L. Carin and L. Deng "Semantic Compositional Networks for Visual Captioning", *Computer Vision and Pattern Recognition (CVPR)* 2017, **Spotlight**
3. C. Gan, **Z. Gan**, X. He, J. Gao and L. Deng "StyleNet: Generating Attractive Visual Captions with Styles", *Computer Vision and Pattern Recognition (CVPR)* 2017
4. **Z. Gan**, P. D. Singh, A. Joshi, X. He, J. Chen, J. Gao and L. Deng "Character-level Deep Conflation for Business Data Analytics", *Int. Conf. Acoustics, Speech and Signal Processing (ICASSP)*, 2017
5. Y. Xian, Y. Pu, **Z. Gan**, L. Lu and A. Thompson "Adaptive DCTNet for Audio Signal Classification", *Int. Conf. Acoustics, Speech and Signal Processing (ICASSP)*, 2017
6. Q. Su, X. Liao, C. Li, **Z. Gan** and L. Carin "Unsupervised Learning with Truncated Gaussian Graphical Models", *Proc. American Association of Artificial Intelligence (AAAI)*, 2017
7. Y. Zhang, **Z. Gan** and L. Carin "Generating Text via Adversarial Training", *NIPS Workshop*, 2016
8. Y. Xian, Y. Pu, **Z. Gan**, L. Lu and A. Thompson "Modified DCTNet for Audio Signals Classification", *Journal of the Acoustical Society of America*, 2016
9. Y. Pu, **Z. Gan**, R. Henao, X. Yuan, C. Li, A. Stevens and L. Carin "Variational Autoencoder for Deep Learning of Images, Labels and Captions", *Neural Information Processing Systems (NIPS)*, 2016
10. J. Song, **Z. Gan** and L. Carin "Factored Temporal Sigmoid Belief Networks for Sequence Learning", *Int. Conf. Machine Learning (ICML)*, 2016
11. C. Li, A. Stevens, C. Chen, Y. Pu, **Z. Gan** and L. Carin "Learning Weight Uncertainty with Stochastic Gradient MCMC for Shape Classification", *Computer Vision and Pattern Recognition (CVPR)* 2016, **Spotlight**
12. C. Chen, D. Carlson, **Z. Gan**, C. Li and L. Carin "Bridging the Gap Between Stochastic Gradient MCMC and Stochastic Optimization", *Artificial Intelligence and Statistics (AISTATS)* 2016, **Oral**
13. **Z. Gan**, C. Li, R. Henao, D. Carlson and L. Carin "Deep Temporal Sigmoid Belief Networks for Sequence Modeling", *Neural Information Processing Systems (NIPS)*, 2015
14. R. Henao, **Z. Gan**, J. Lu and L. Carin "Deep Poisson Factor Modeling", *Neural Information Processing Systems (NIPS)*, 2015
15. **Z. Gan**, C. Chen, R. Henao, D. Carlson and L. Carin "Scalable Deep Poisson Factor Analysis for Topic Modeling", *Int. Conf. Machine Learning (ICML)*, 2015
16. **Z. Gan**, R. Henao, D. Carlson and L. Carin "Learning Deep Sigmoid Belief Networks with Data Augmentation", *Artificial Intelligence and Statistics (AISTATS)*, 2015

### Book Chapter

1. **Z. Gan**, X. Yuan, R. Henao, E. Tsalik and L. Carin "Inference of Gene Networks Associated with the Host Response to Infectious Disease", Chapter 13 of Book *Big Data Over Networks*. Cambridge University Press. In Press.

### Software Skills

Python, Matlab, R and C

### Awards

ECE Fellowship, Duke University, 2013

National Scholarship, Department of Minister of Education of China, 2010-2013.

### Teaching Experience

Teaching Assistant	09/2014-12/2014
STA 601 - Bayesian and Modern Statistics	
Instructor: David Dunson, Ph.D	
Teaching Assistant	01/2015-05/2015
ECE 587 - Information Theory	
Instructor: Ahmad Beirami, Ph.D	

### Graduate Coursework

Bayesian and Modern Statistics, Probabilistic Machine Learning, Advanced Machine Learning, Statistical Inference, Statistical Computation, Information Theory, Graphical Models & Inference, Optimization For Engineers