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## Chunyuan Li

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### Research Interests

My recent research focuses on large-scale pre-training of deep neural networks in computer vision and natural language processing.

### Education

- **Duke University**, Durham, NC 2014 - 2018  
Ph.D., Electrical and Computer Engineering, GPA: 3.9/4.0.  
Bayesian and Modern Statistics      Statistical Computation  
Probabilistic & Advanced Machine Learning      Information Theory  
Discrete Optimization      Graphical Models & Inference
- **Concordia University**, Montreal, Canada 09/2011 - 2013  
M.S., Quality System Engineering, University Merit Award (top 0.5%)
- **Huazhong University of Science and Technology**, Wuhan, China 09/2007 - 06/2011  
B.E., Electronics and Information Engineering, Excellent Undergraduate Thesis (top 1%)

### Research Experiences

- **Microsoft Research**, Redmond, WA 2018 - present  
Senior Researcher, deep learning team at MSR AI  
Self-supervised representation learning with large-scale pre-training and datasets, with demonstrated project experience/papers in natural language modeling, image generation/representations, vision-and-language, dialog tasks.
- **Information Initiative at Duke (iiD)** 2014 - 2018  
Research assistant. Advisor: Prof. Lawrence Carin  
(i) Scalable Bayesian learning methods for the weight uncertainty of deep neural networks  
(ii) Deep generative models, e.g., GANs and VAEs.
- **Uber AI Labs**, San Francisco, CA Summer, 2017  
Research Scientist Intern. Mentor: Jason Yosinski  
Subspace training of neural networks; one paper & patent
- **Adobe Research**, San Jose, CA Summer, 2016  
Data Scientist Intern. Mentors: H. Bui, M. Ghavamzadeh and G. Theodorou  
(i) Product: Recurrent neural networks for digital market forecasting; one patent  
(ii) Science: Investigation of Bayesian deep reinforcement learning
- **National Institute of Standards and Technology**, MD 09/2013 - 08/2014  
Organized and participated shape retrieval contests in Eurographics 2014
- **Geometrica Group of INRIA Saclay**, France Summer, 2013  
Research intern. Mentors: Maks Ovsjanikov and Frederic Chazal  
Developed algorithms for object recognition via topological persistence
- **Concordia University**, Montreal, Canada 09/2011 - 04/2013  
Deformable 3D shape analysis via spectral geometry
- **Ankon International** Summer, 2011  
Developed novel online redundant image elimination algorithms for wireless capsule endoscopy
- **Huazhong University of Science and Technology** 2009 - 2011  
Worked on algorithms for 2D shape analysis and classification

## Publications [Citations=4129, h-index=36, i10-index=54]

### Preprint

1. C. Li, J. Yang, P. Zhang, M. Gao, B. Xiao, X. Dai, L. Yuan, J. Gao  
Efficient Self-supervised Vision Transformers for Representation Learning
2. C. Li, X. Li, L. Zhang, B. Peng, M. Zhou and J. Gao  
Self-supervised Pre-training with Hard Examples Improves Visual Representations
3. J. Yang, C. Li, P. Zhang, X. Dai, B. Xiao, L. Yuan, J. Gao  
Focal Self-attention for Local-Global Interactions in Vision Transformers
4. J. Huang, C. Li<sup>†</sup>, K. Subudhi, W. Chen, B. Peng, J. Gao and J. Han (<sup>†</sup> Corresponding author)  
Few-Shot Named Entity Recognition: A Comprehensive Study

### Selected Journal and Conference

1. B. Peng, C. Li, D. Zhang, J. Li, C. Zhu, and J. Gao  
Raddle: An Evaluation Benchmark and Platform for Robust Task-oriented Dialog Systems  
*Annual Meeting of the Association for Computational Linguistics (ACL)* 2021
2. K. Bi, P. Metrikov, C. Li, B. Byun  
Leveraging User Behavior History for Personalized Email Search  
*The Web Conference (WWW)* 2021
3. B. Peng, C. Li, J. Li, S. Shayandeh, L. Liden, J. Gao  
Soloist: Few-shot Task-Oriented Dialog with A Single Pre-trained Auto-regressive Model  
*Transactions of the Association for Computational Linguistics (T-ACL)* 2021
4. M. Armandpour, A. Sadeghian, C. Li and M. Zhou  
Partition-Guided GANs  
*Conference on Computer Vision and Pattern Recognition (CVPR)* 2021
5. P. Chapfuwa, C. Tao, C. Li, I. Khan, K.J. Chandross, M.J. Pencina, L. Carin and R. Henao  
Calibration and Uncertainty in Neural Time-to-Event Modeling  
*IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)* 2021
6. C. Li, X. Gao, Y. Li, X. Li, B. Peng, Y. Zhang, J. Gao  
Optimus: Organizing Sentences via Pre-trained Modeling of a Latent Space  
*Empirical Methods in Natural Language Processing (EMNLP)* 2020
7. B. Peng, C. Zhu, C. Li, X. Li, J. Li, M. Zeng, and J. Gao  
Few-shot Natural Language Generation for Task-Oriented Dialogue  
*Empirical Methods in Natural Language Processing (EMNLP)* 2020
8. Y. Zhang\*, G. Wang\*, C. Li, Z. Gan, C. Brockett, B. Dolan  
Pointer: Constrained Text Generation via Insertion-based Generative Pre-training  
*Empirical Methods in Natural Language Processing (EMNLP)* 2020
9. B. An, J. Lyu, Z. Wang, C. Li, C. Hu, F. Tan, R. Zhang, Y. Hu and C. Chen  
Repulsive Attention: Rethinking Multi-head Attention as Bayesian Inference  
*Empirical Methods in Natural Language Processing (EMNLP)* 2020
10. J. Li\*, C. Li\*, G. Wang\*, H. Fu, Y. Lin, L. Chen, Y. Zhang et al  
Improving Text Generation with Student-Forcing Optimal Transport  
*Empirical Methods in Natural Language Processing (EMNLP)* 2020
11. S. Yuan, K. Bai, L. Chen, Y. Zhang, C. Tao, C. Li, G. Wang, R. Henao, L. Carin  
Weakly Supervised Cross-domain Alignment with Optimal Transport  
*British Machine Vision Conference (BMVC)* 2020 **Oral Presentation**
12. X. Li, X. Yin, C. Li, P. Zhang, X. Hu, L. Zhang, H. Hu, L. Dong, F. Wei, Y. Choi and J. Gao  
Oscar: Object-Semantics Aligned Pre-training for Vision-Language Tasks  
*European Conference on Computer Vision (ECCV)* 2020
13. P. Yu, Y. Zhao, C. Li, J. Yuan and C. Chen  
Structure-Aware Human-Action Generation  
*European Conference on Computer Vision (ECCV)* 2020

14. Y. Zhao\*, C. Li\*, J. Gao, and C. Chen (\* Equal contribution)  
Feature Quantization Improves GAN Training  
*International Conference on Machine Learning (ICML)* 2020
15. W. Hao\*, C. Li\*, X. Li, L. Carin and J. Gao (\* Equal contribution)  
Towards Learning a Generic Agent for Vision-and-Language Navigation via Pre-training  
*Conference on Computer Vision and Pattern Recognition (CVPR)* 2020
16. R. Zhang, C. Li, J. Zhang, C. Chen, and A. G. Wilson  
Cyclical Stochastic Gradient MCMC for Bayesian Deep Learning  
*International Conference on Learning Representations (ICLR)* 2020  
**Oral Presentation, acceptance rate 1.8%**
17. S. Lobel\*, C. Li\*, J. Gao, and L. Carin (\* Equal contribution)  
Towards Amortized Ranking-Critical Training for Collaborative Filtering  
*International Conference on Learning Representations (ICLR)* 2020
18. Y. Li, C. Li<sup>†</sup>, Y. Zhang, X. Li, G. Zheng, L. Carin and J. Gao (<sup>†</sup> Corresponding author)  
Complementary Auxiliary Classifiers for Label-Conditional Text Generation  
*AAAI Conference on Artificial Intelligence (AAAI)* 2020
19. P. Chapfuwa, C. Li, N. Mehta, L. Carin, and R. Henao  
Survival Cluster Analysis  
*ACM Conference on Health, Inference, and Learning (CHIL)* 2020
20. M Gong, Y Xu, C. Li, K Zhang, K Batmanghelich  
Twin Auxiliary Classifiers GAN  
*Neural Information Processing Systems (NeurIPS)* 2019  
**Spotlight Presentation, acceptance rate 2.4%**
21. Robust Navigation with Language Pre-training and Stochastic Sampling  
X Li, C. Li, Q Xia, Y Bisk, A Celikyilmaz, J Gao, NA Smith, Y Choi  
*Empirical Methods in Natural Language Processing (EMNLP)* 2019
22. L Fang, C. Li, J Gao, W Dong, C Chen  
Implicit Deep Latent Variable Models for Text Generation  
*Empirical Methods in Natural Language Processing (EMNLP)* 2019
23. H. Fu\*, C. Li\*, X. Liu, J. Gao, A. Celikyilmaz, and L. Carin (\* Equal contribution)  
"Cyclical Annealing Schedule: A Simple Approach to Mitigating KL Vanishing"  
*North American Association for Computational Linguistics (NAACL)* 2019, **Oral Presentation**
24. C. Li, K. Bai, J. Li, G. Wang, C. Chen, and L. Carin  
"Adversarial Learning of a Sampler Based on an Unnormalized Distribution"  
*Artificial Intelligence and Statistics (AISTATS)* 2019
25. C. Li, C. Chen, Y. Pu, R. Henao and L. Carin  
"Communication-efficient Stochastic Gradient MCMC for Neural Networks"  
*AAAI Conference on Artificial Intelligence (AAAI)* 2019
26. C. Li, H. Farkhoor, R. Liu and J. Yosinski  
"Measuring the Intrinsic Dimension of Objective Landscapes"  
*International Conference on Learning Representations (ICLR)* 2018
27. C. Chen, C. Li, L. Chen, W. Wang, Y. Pu and L. Carin  
"Continuous-Time Flows for Efficient Inference and Density Estimation"  
*International Conference on Machine Learning (ICML)* 2018
28. R. Zhang, C. Chen, C. Li, and L. Carin  
"Policy Optimization as Wasserstein Gradient Flows"  
*International Conference on Machine Learning (ICML)* 2018
29. P. Chapfuwa, C. Tao, C. Li, C. Page, B. Goldstein, L. Carin, R. Henao  
"Adversarial Time-to-Event Modeling"  
*International Conference on Machine Learning (ICML)* 2018
30. G. Wang, C. Li<sup>†</sup>, W. Wang, Y. Zhang, D. Shen, and L. Carin (<sup>†</sup> Corresponding author)  
"Joint Word and Label Embeddings for Text Classification"  
*Annual Meeting of the Association for Computational Linguistics (ACL)* 2018

31. D. Shen, G. Wang, W. Wang, M. Min, Q. Su, Y. Zhang, **C. Li**, R. Henao and L. Carin  
"On Simple Word-Embedding-Based Models and Associated Pooling Mechanisms"  
*Annual Meeting of the Association for Computational Linguistics (ACL)* 2018
32. R. Zhang, **C. Li**, C. Chen, and L. Carin  
"Learning Structural Weight Uncertainty for Sequential Decision-Making"  
*Artificial Intelligence and Statistics (AISTATS)* 2018
33. L. Chen, S. Dai, Y. Pu, **C. Li**, Q. Su, and L. Carin  
"Symmetric Variational Autoencoder and Connections to Adversarial Learning"  
*Artificial Intelligence and Statistics (AISTATS)* 2018
34. J. Lu, **C. Li**, J. Singh-Alvarado, Z. Zhou, F. Frohlich, R. Mooney and F. Wang  
"MIN<sub>1</sub>PIPE: A Miniscope 1-photon-based Calcium Imaging Signal Extraction Pipeline"  
**Cell Report** 2018 (Impact factor: 8.282)
35. **C. Li**, H. Liu, C. Chen, Y. Pu, L. Chen, R. Henao and L. Carin  
"ALICE: Towards Understanding Adversarial Training for Joint Distribution Matching"  
*Neural Information Processing Systems (NIPS)* 2017
36. Y. Pu, Z. Gan, R. Henao, **C. Li**, S. Han and L. Carin  
"VAE Learning via Stein Variational Gradient Descent"  
*Neural Information Processing Systems (NIPS)* 2017
37. Y. Pu, W. Wang, R. Henao, L. Chen, Z. Gan, **C. Li**, and L. Carin  
"Adversarial Symmetric Variational Autoencoder",  
*Neural Information Processing Systems (NIPS)* 2017
38. Z. Gan, L. Chen, W. Wang, Y. Pu, Y. Zhang, H. Liu, **C. Li**, and L. Carin  
"Triangle Generative Adversarial Networks",  
*Neural Information Processing Systems (NIPS)* 2017
39. Z. Gan\*, **C. Li\***, C. Chen, Q. Su, Y. Pu, and L. Carin (\* **Equal contribution**)  
"Scalable Bayesian Learning of Recurrent Neural Networks for Language Modeling"  
*Annual Meeting of the Association for Computational Linguistics (ACL)* 2017, **Oral Presentation**
40. Z. Gan, Y. Pu, R. Henao, **C. Li**, X. He and L. Carin  
"Learning Generic Sentence Representations using Convolutional Neural Networks"  
Empirical Methods on Natural Language Processing (EMNLP) 2017, **Oral Presentation**
41. Q. Su, X. Liao, **C. Li**, and Z. Gan, L. Carin  
"Restricted Truncated Gaussian Graphical Models"  
*AAAI Conference on Artificial Intelligence (AAAI)* 2017, **Oral Presentation**
42. **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 Presentation, acceptance rate 9.7%**
43. **C. Li**, C. Chen, D. Carlson and L. Carin  
"Preconditioned Stochastic Gradient Langevin Dynamics for Deep Neural Networks"  
*AAAI Conference on Artificial Intelligence (AAAI)* 2016, **Oral Presentation**
44. **C. Li**, C. Chen, K. Fan and L. Carin  
"High-Order Stochastic Gradient Thermostats for Bayesian Learning of Deep Models"  
*AAAI Conference on Artificial Intelligence (AAAI)* 2016
45. C. Chen, N. Ding, **C. Li**, Y. Zhang and L. Carin  
"Stochastic Gradient MCMC with Stale Gradients"  
*Neural Information Processing Systems (NIPS)* 2016
46. Y. Pu, Z. Gan, R. Henao, Y. Xin, **C. Li**, A. Stevens, and L. Carin  
"Variational Autoencoder for Deep Learning of Images, Labels and Captions"  
*Neural Information Processing Systems (NIPS)* 2016
47. K. Fan, **C. Li**, and K. Heller  
"Hierarchical Graph-Coupled HMM with an Application to Influenza Infection"  
*AAAI Conference on Artificial Intelligence (AAAI)* 2016

48. Y. Zhang, R. Henao, **C. Li** and L. Carin  
"Bayesian Dictionary Learning with Gaussian Processes and Sigmoid Belief Networks"  
*Int. Joint Conference on Artificial Intelligence (IJCAI)* 2016
49. 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 Presentation, acceptance rate 6.5%**
50. Y. Pu, X. Yuan, A. Stevens, **C. Li** and L. Carin  
"A Deep Generative Deconvolutional Image Model"  
*Artificial Intelligence and Statistics (AISTATS)* 2016
51. D. Pickup, X. Sun, P. L. Rosin, R. R. Martin, **C. Li et al.**  
"Shape Retrieval of Non-Rigid 3D Human Models",  
*Int. Journal of Computer Vision (IJCV)* 2016
52. 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
53. B. Li, Y. Lu, **C. Li**, A. Godil, T. Schreck, *et al.*  
"A Comparison of 3D Shape Retrieval Methods: A Benchmark with Multimodal Queries",  
*Computer Vision and Image Understanding (CVIU)* 2015
54. **C. Li**, M. Ovsjanikov and F. Chazal  
"Persistence-based Structural Recognition"  
*Computer Vision and Pattern Recognition (CVPR)* 2014
55. Z. Ren, J. Yuan, **C. Li** and W. Liu  
"Minimum Near-Convex Decomposition for Shape Representation"  
*International Conference on Computer Vision (ICCV)* 2011
56. **C. Li** and A. Ben Hamza  
"Spatially Aggregating Spectral Descriptors for Non-Rigid 3D Shape Retrieval: A Comprehensive Comparison", *Multimedia Systems*, 2014
57. **C. Li** and A. Ben Hamza  
"Symmetry Discovery and Retrieval of Nonrigid 3D Shapes using Geodesic Skeleton Paths",  
*Multimedia Tools and Applications*, 2014
58. **C. Li** and A. Ben Hamza  
"A Multi-Resolution Descriptor for Deformable 3D Shape Retrieval",  
*Visual Computer (Computer Graphics International, acceptance rate 18%)*, 2013

## Patents

"Metric Forecasting Employing a Similarity Determination in a Digital Medium Environment"  
**C. Li**, H. Bui, M. Ghavamzadeh and G. Theodoropoulos, *US20180276691A1*

"Generating Compressed Representation Neural Networks Having High Degree of Accuracy"  
Jason. Yosinski, **C. Li**, and Ruoyuan Liu, *US20190130272A1*

## Teaching Experiences

Teaching assistant. Besides grading and office hours, I gave the following lectures.

**STA571 Machine Learning:** Design discussion material and lead the discussion lecture every week

**ECE681 Pattern Classification:** Guest Lecture on *Introduction to Deep Neural Networks*

## Students/Interns Mentored

- Jiaxin Huang, PhD student at UIUC, Microsoft Research Fellowship
- Keping Bi, WWW 2021 paper, PhD student at University of Massachusetts Amherst
- Yang Zhao, ICML 2020 paper, PhD student at University of Buffalo
- Paidamoyo Chapfuwa, CHIL 2020 paper, PhD student at Duke University
- Christy Li, AAAI 2020 paper, PhD student at Duke University
- Ruqi Zhang, ICLR 2020 paper, PhD student at Cornell University
- Le Fang, EMNLP 2019 paper, PhD student at University of Buffalo
- Hao Fu, NAACL 2019 paper, PhD student at Duke University
- Ke Bai, AISTATS 2019 paper, PhD student at Duke University
- Guoyin wang, ACL 2018 paper, PhD student at Duke University
- Ruiyi Zhang, AISTATS 2018 paper, PhD student at Duke University
- Sam Lobel, ICLR 2020 paper. Visiting student at Duke, now PhD student at Brown University
- Hao Liu, NIPS 2017 paper. Visiting student at Duke, now PhD student at Caltech

## Academic Activities

**Senior PC** : AAAI 2020/2021

**Reviewer / PC** :

- Natural Sciences and Engineering Research Council of Canada (NSERC)
- NIPS 2020/2019/2018/2016, ICML 2019/2018, ICLR 2020/2019/2018, AISTATS 2019/2018
- ICCV 2019, CVPR 2019/2018, ECCV 2020, ACCV 2018
- ACL 2020/2018, NAACL 2020, NAACL 2019
- IJCAI 2020/2019, AAAI 2019/2018
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- International Journal of Computer Vision
- Computer Vision and Image Understanding
- Pattern Recognition
- IEEE Transactions on Neural Networks and Learning Systems

**Organizer:**

- Weakly-supervised and Unsupervised Learning Workshop, *SIAM SDM* 2020
- Two SHREC 3D shape retrieval contests in *Eurographics workshop on 3DOR* 2014

**Talks**

- "Deep Generative Models at Scale"  
*Microsoft Research, Baidu Research, 2020*
- "Towards Better Representations with Deep/Bayesian Learning"  
*Salesforce Research, IBM Watson Research Center, Microsoft Research, Google Research, 2018*
- "Scalable Bayesian Learning of Recurrent Neural Networks for Language Modeling"  
*ACL, Vancouver, Canada, August 2017*
- "Scalable Bayesian Methods for Deep Learning", OpenAI, San Francisco, Feb. 2017
- "Learning Weight Uncertainty with Stochastic Gradient MCMC for Shape Classification"  
*Computer Vision and Pattern Recognition, Las Vegas, NV, June 2016*
- "Preconditioned Stochastic Gradient Langevin Dynamics for Deep Neural Networks"  
*AAAI Conference on Artificial Intelligence, Phoenix, AZ, Feb. 2016*
- "Large-scale Comprehensive 3D Shape Retrieval"  
*Eurographics workshop on 3DOR, Strasbourg, France, April 2014*

## Software Skills

Python (Pytorch, Tensorflow and Keras), Matlab, R and C