Boqing Gong, Ph.D.

CONTACT INFORMATION

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EMPLOYMENT

Principal Researcher — 01/2018 –
Tencent AI Lab

Principal Investigator — 01/2018 –
International Computer Science Institute
University of California, Berkeley

Assistant Professor (tenure-track) — 08/2015 – 12/2017
Center for Research in Computer Vision
Department of Computer Science
University of Central Florida

Summer Research Assistant — 06/2013 – 08/2013
Department of Media Analytics
NEC Laboratories America

Research Assistant — 01/2008 – 06/2008
Visual Computing Group
Microsoft Research Asia

EDUCATION

University of Southern California, Los Angeles, California
Ph.D. in Computer Science — 08/2011 – 08/2015
Thesis: Kernel Methods for Unsupervised Domain Adaptation
Thesis committee: Fei Sha (advisor), Gaurav Sukhatme, and Shrikanth Narayanan

The Chinese University of Hong Kong, Shatin, Hong Kong
M.Phil. in Information Engineering — 08/2008 – 07/2010
Thesis: 3D Object Retrieval and Recognition
Thesis advisors: Xiaoou Tang (primary), Jianzhuang Liu, and Xiaogang Wang

University of Science and Technology of China, Hefei, Anhui, China
B.E. in Electronic Engineering and Information Science — 09/2004 – 07/2008

Research Summary

Overview. A research scientist in machine learning and computer vision, I am interested in developing data-efficient algorithms to solve large-scale visual recognition and planning problems. My research has been focusing on domain adaptation, reinforcement learning, semi-supervised and self-supervised learning, few-shot and zero-shot learning, learning from the Web, and the visual analytics of objects, human activities, scenes, and their attributes using deep and generative models.

The underlying theme of my research. I appreciate interdisciplinary research — abstracting interesting questions and applying new findings from various real-world problems to develop improved machine learning algorithms, and drawing techniques from machine learning to investigate fundamental tasks in computer vision. I strive to understand the mathematical structure of the research questions in order to develop effective and efficient algorithmic solutions, with strong analytical properties and compelling practical performance.

Recent work. My recent work is powered by deep learning and generative models (e.g., sequential determinantal point process), as well as the confluence of the two (e.g., generative adversarial nets). I have been expanding the realm of domain adaptation to a variety of new applications in computer vision and reinforcement learning. Advances in domain adaptation will significantly increase our capability of deploying intelligent systems in challenging environments where uncertainty prevails.

From the applied research point of view, my recent projects include but are not limited to object recognition, semantic segmentation, visual navigation, semantic planning, human activity recognition, image tagging, supervised video summarization, face detection and recognition, 3D object retrieval, text summarization, and sentiment analysis.

Future work. I expect to develop the next generation of statistical machine learning algorithms which are capable of handling the mismatches in data and not limited by the simple assumption that the training and test data are drawn i.i.d. from the same distribution. Towards this long-term goal, my current plan is to research on domain adaptation, few-shot learning, and reinforcement learning of deep, generative, and decision-making models.

Publications

Statistics as of October 2nd, 2018 by Google Scholar:
Citations: 1842 h-index: 17 i10-index: 21 citations of (CVPR'12) [C4]: 769

* indicates student authors. = indicates equal contribution among authors.

Invited Book Chapters

[B2] **B. Gong**, K. Grauman, and F. Sha. "Geodesic Flow Kernel and Landmarks: Kernel Methods for Unsupervised Domain Adaptation." In *Domain Adaptation for Computer Vision Applications*, Springer Publishing, 2017.

[B1] C. Gan*, T. Yang, and **B. Gong**. "A Multi-Source Domain Generalization Approach to Visual Attribute Detection." In *Domain Adaptation for Computer Vision Applications*, Springer Publishing, 2017.

Journal Publications

[J3] A. Mazaheri*, **B. Gong**, and M. Shah. "Learning a Multi-Concept Video Retrieval Model with Multiple Latent Variables." *ACM Transactions on Multimedia Computing, Communications, and Applications* (**TOMM**), Vol. 14, Issue 2, May 2018.

[J2] **B. Gong**, K. Grauman, and F. Sha. "Learning Kernels for Unsupervised Domain Adaptation with Applications to Visual Object Recognition." *International Journal of Computer Vision* (**IJCV**), Vol. 109, Issue 1-2, pp. 3-27, Aug. 2014. [`Link`]

[J1] **B. Gong**, J. Liu, X. Wang, and X. Tang. "Learning Semantic Signatures for 3D Object Retrieval." *IEEE Transactions on Multimedia* (**T-MM**), Vol. 5, Issue 2, pp. 369-377, Feb. 2013.

Peer-Reviewed Conference Publications

[C28] H. Hu=, L. Chen=, **B. Gong**, and F. Sha. "Synthesize Policies for Transfer and Adaptation across Environments and Tasks." *Proceedings of the Neural Information Processing Systems* (**NIPS**), Montreal, Canada, Dec. 2018. (**Spotlight**)

[C27] Y. Li*, L. Wang, T. Yang, and **B. Gong**. "How Local is the Local Diversity? Reinforcing Sequential Determinantal Point Processes with Dynamic Ground Sets for Supervised Video Summarization." *Proceedings of the European Conference on Computer Vision* (**ECCV**), Munich, Germany, September 2018.

[C26] A. Sharghi*, A. Borji, C. Li, T. Yang, and **B. Gong**. "Improving Sequential Determinantal Point Processes for Supervised Video Summarization." *Proceedings of the European Conference on Computer Vision* (**ECCV**), Munich, Germany, September 2018.

[C25] MA. Jamal*, H. Li, and **B. Gong**. "Face Detector Adaptation without Negative Transfer or Catastrophic Forgetting." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Salt Lake City, Utah, June 2018.

[C24] L. Fan*=, W. Huang=, C. Gan, S. Ermon, **B. Gong**, and J. Huang. "End-to-End Learning of Motion Representation for Video Understanding." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Salt Lake City, Utah, June 2018. (**Spotlight**)

[C23] C. Gan*, **B. Gong**, H. Su, and L. Guibas. "Geometry-Guided CNN for Self-Supervised Video Representation Learning." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Salt Lake City, Utah, June 2018.

[C22] X. Wei*=, **B. Gong**=, Z. Liu, W. Lu, and L. Wang. "Improving the Improved Training of Wasserstein GANs: A Consistency Term and Its Dual Effect." *Proceedings of the International Conference on Learning Representations* (**ICLR**), Vancouver Canada, April 2018.

[C21] Y. Ding*, L. Wang, D. Fan, and **B. Gong**. "A Semi-Supervised Two-Stage Approach to Learning from Noisy Labels." *Proceedings of the IEEE Winter Conference on Applications of Computer Vision* (**WACV**), Lake Tahoe, NV, March 2018. (**Spotlight**)

[C20] Z. Yang*, **B. Gong**, and S. Narayanan. "Weighted Geodesic Flow Kernel for Interpersonal Mutual Influence Modeling and Emotion Recognition in Dyadic Interactions." *Proceedings of the International Conference on Affective Computing and Intelligent Interaction* (**ACII**), San Antonio, TX, October 2017. (**Oral**)

[C19] Y. Zhang*, P. David, and **B. Gong**. "Curriculum Domain Adaptation for Semantic Segmentation of Urban Scenes." *Proceedings of the IEEE International Conference on Computer Vision* (**ICCV**), Venice, Italy, October 2017.

[C18] C. Gan*, Y. Li*, H. Li, C. Sun, and **B. Gong**. "VQS: Linking Segmentations to Questions and Answers for Supervised Attention in VQA and Question-Focused Semantic Segmentation." *Proceedings of the IEEE International Conference on Computer Vision* (**ICCV**), Venice, Italy, October 2017.

[C17] A. Sharghi*, J. Laurel*, and **B. Gong**. "Query-Focused Video Summarization: Dataset, Evaluation, and A Memory Network Based Approach." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Honolulu, Hawaii, Jun. 2017.

[C16] M. Kalayeh*, **B. Gong**, and M. Shah. "Improving Facial Attribute Prediction using Semantic Segmentation." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Honolulu, Hawaii, Jun. 2017.

[C15] Z. Li*, **B. Gong**, and T. Yang. "Improved Dropout for Shallow and Deep Learning." *Proceedings of the Neural Information Processing Systems* (**NIPS**), Barcelona, Spain, Dec. 2016.

[C14] C. Gan*, C. Sun, L. Duan, and **B. Gong**. "Labeling-Free Video Recognition by Mutually Voting for Relevant Web Images and Web Video Frames." *Proceedings of the European Conference on Computer Vision* (**ECCV**), Amsterdam, Netherlands, Oct. 2016.

[C13] A. Sharghi*, **B. Gong**, and M. Shah. "Query-Focused Extractive Video Summarization." *Proceedings of the European Conference on Computer Vision* (**ECCV**), Amsterdam, Netherlands, Oct. 2016.

[C12] W-L. Chao*, S. Changpinyo*, **B. Gong**, and F. Sha. "An Empirical Study and Analysis of Generalized Zero-Shot Learning for Object Recognition in the Wild." *Proceedings of the European Conference on Computer Vision* (**ECCV**), Amsterdam, Netherlands, Oct. 2016. (**Spotlight**)

[C11] Y. Zhang*, **B. Gong**, and M. Shah. "Fast Zero-Shot Image Tagging." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Las Vegas, NV, Jun. 2016.

[C10] C. Gan*, T. Yang, and **B. Gong**. "Learning Attributes Equals Multi-Source Domain Generalization." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Las Vegas, NV, Jun. 2016. (**Spotlight**)

[C9] S. Changpinyo*=, W. Chao*=, **B. Gong**, and F. Sha. "Synthesized Classifiers for Zero-Shot Learning." *Proceedings of the IEEE Conference on Computer Vision and Pattern*

Recognition (**CVPR**), Las Vegas, NV, Jun. 2016. (**Oral**)

[C8] W. Chao*=, **B. Gong**=, F. Sha, and K. Grauman. "Large-Margin Determinantal Point Processes." *Proceedings of the Conference on Uncertainty in Artificial Intelligence* (**UAI**), Amsterdam, Netherlands, July 2015. [Link]

[C7] **B. Gong**=, W. Chao=, K. Grauman, and F. Sha. "Diverse Sequential Subset Selection for Supervised Video Summarization." *Proceedings of the Neural Information Processing Systems* (**NIPS**), Montreal, Canada, Dec. 2014.

[C6] **B. Gong**, K. Grauman, and F. Sha. "Reshaping Visual Datasets for Domain Adaptation." *Proceedings of the Neural Information Processing Systems* (**NIPS**), Lake Tahoe, NV, Dec. 2013.

[C5] **B. Gong**, K. Grauman, and F. Sha. "Connecting the Dots with Landmarks: Discriminatively Learning Domain-Invariant Features for Unsupervised Domain Adaptation." *Proceedings of the International Conference on Machine Learning* (**ICML**), Atlanta, GA, Jun. 2013. (**Oral**)

[C4] **B. Gong**, Y. Shi, F. Sha, and K. Grauman. "Geodesic Flow Kernel for Unsupervised Domain Adaptation." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), Providence, RI, Jun. 2012. (**Oral**)

[C3] **B. Gong**, J. Liu, X. Wang, and X. Tang. "3D Object Retrieval with Semantic Attributes." *Proceedings of the 19th ACM international conference on Multimedia* (ACM **MM**), Scottsdale, Arizona, Dec. 2011. (demo)

[C2] **B. Gong**, C. Xu, J. Liu, and X. Tang. "Boosting 3D Object Retrieval by Object Flexibility". *Proceedings of the 17th ACM international conference on Multimedia* (ACM **MM**), Beijing, China, Oct. 2009.

[C1] **B. Gong**, Y. Wang, J. Liu, and X. Tang. "Automatic Facial Expression Recognition on a Single 3D Face by Exploring Shape Deformation". *Proceedings of the 17th ACM international conference on Multimedia* (ACM **MM**), Beijing, China, Oct. 2009.

Selected Peer-Reviewed Workshop Publications

[W2] A. Mazaheri*, B. Gong, and M. Shah. "Learning a Multi-Concept Video Retrieval Model with Multiple Latent Variables." *The 12th IEEE International Workshop on Multimedia Information Processing and Retrieval*, Dec. 2016.

[W1] **B. Gong**, F. Sha, and K. Grauman. "Overcoming Dataset Bias: An Unsupervised Domain Adaptation Approach." *The First International Workshop on Large Scale Visual Recognition and Retrieval* (BigVision) at NIPS, Lake Tahoe, NV, Dec. 2012. (**Oral**)

Grants

BIGDATA: IA: Distributed Semi-Supervised Training of Deep Models and Its Applications in Video Understanding

Funding agency: **NSF** IIS-1741431 Role: Principal Investigator (PI)

Amount: ($662,431+$42,500 AWS Credits)/3

Duration: 09/2017 – 08/2020 (Transferred to ex-colleagues after joining Tencent)

Significance: The first of its kind ever granted to University of Central Florida

CRII: RI: Multi-Source Domain Generalization Approaches to Visual Attribute Detection

Funding agency: **NSF** IIS-1566511 Role: Sole Principal Investigator (So-PI)

Amount: $175,000

Duration: 05/2016 – 04/2018

Significance: The first of its kind ever granted to University of Central Florida

Multiple-Modal Summarization of Videos and Photo Albums with User Input

FutureWei Technologies Inc., So-PI, $100,000 (Declined) 07/2017

Face Detector Adaptation without Forgetting

Adobe Research, So-PI, $10,000 05/2017

User-Guided Visual Analytics

Adobe Research, So-PI, $7,000 10/2016

Collaborative Research: Florida-IT-Pathways to Success (Flit-Path)

NSF DUE-1643965, Co-PI 10/2016 – 12/2017

Teaching Experiences

CAP 4453: Robot Vision

Fall 2016, Number of students: 64, Student rating: 3.90/5 (Department median: 3.81)

Fall 2017 (fully online), Number of students: 30, rating: **4.29/5** (Department median: 3.82)

CAP 6412: Advanced Computer Vision

Spring 2016, Number of students: 18, Student rating: **4.10/5** (Department median: 3.85)

Invited Talks

The Multiple Shades of Dropout for Discriminative and Generative Deep Neural Networks

Special Session, "Stochastic Optimization Methods and Approximation Theory in Machine Learning", at the **INFORMS** Annual Meeting 11/04/2018

Domain Adaptation and Transfer: All You Need to Use Simulation "for Real"

ECCV Workshop on Visual Learning and Embodied Agents in Simulation Environments 09/09/2018

Learning and Adapting from the Web for Visual Recognition

ECCV Workshop on Compact and Efficient Feature Representation and Learning in Computer Vision 09/09/2018

IEEE **CVPR Workshop** on Visual Understanding by Learning from Web Data 06/18/2018

Domain Adaptation for Robust Visual Recognition and Semantic Segmentation

Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences 04/02/2018

Shenzhen University 03/26/2018

International Computer Science Institute, UC Berkeley 12/08/2017

Beijing University of Posts and Telecommunications 11/06/2017

Department of Electrical Engineering, UC Santa Cruz 10/25/2017

Google Research at Mountain View 09/20/2017

Department of Media Analytics, NEC Laboratories America 05/08/2017

NVIDIA Research 06/08/2017

Sequential Determinantal Point Processes and Variations for Supervised Video Summarization

Department of Computer Science, Stanford University 03/20/2017

Adobe Systems Inc. 03/30/2017

Facebook Inc. 06/07/2017

University of California at Berkeley 08/24/2017

Domain Adaptation for Human Activity Detection, Recognition, and Summarization

Army Research Office / Information Science Institute Workshop on Multi-Modal Data Analysis for Human Activity Detection and Understanding 09/13/2016

Query-Focused Extractive Video Summarization via Determinantal Point Processes

Electrical Engineering and Computer Sciences, Univ. California at Berkeley 09/21/2017

Department of Computer Science, University of California at Irvine 07/08/2016

Snapchat Inc. 08/18/2016

Kernel Methods for Unsupervised Domain Adaptation

Information Science Institute, University of Southern California 12/11/2015

Department of Computer Science, Tulane University 04/23/2015

Department of Machine Learning, NEC Laboratories America 04/09/2015

Department of EECS, University of Central Florida 04/07/2015

School of Computing, Informatics, and Decision Systems Engineering, ASU 04/02/2015

IBM T.J. Watson Research Center (colloquium) 01/15/2015

ECCV Workshop on TASK-CV 09/12/2014

Reshaping Datasets for Unsupervised Domain Adaptation

IEEE **ICDM Workshop** on Practical Transfer Learning 11/14/2015

Sequential Determinantal Point Process: Modeling the Diverse and Sequential Properties in Video Summarization

Department of EECS, University of Central Florida 07/08/2015

Discriminative Kernel Learning for Unsupervised Domain Adaptation

Machine Learning and Instrument Autonomy Group, JPL, NASA 01/09/2014

Academic & Professional Services

National Science Foundation (NSF) Panelist: three panels in 2016 and one in 2017

Tutorial chair of IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2022

Area chair / Senior program committee member of

IEEE Winter Conference on Applications of Computer Vision (WACV) 2018 – 2019

International Conference on Machine Learning (ICML) 2019

International Conference on Artificial Intelligence and Statistics (AISTATS) 2019

Reviewer of

Neural Information Processing Systems (NIPS) 2014 –

International Conference on Machine Learning (ICML) 2015 –

IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2013 –

European Conference on Computer Vision (ECCV) 2014 –

IEEE International Conference on Computer Vision (ICCV) 2013 –

Conference on Artificial Intelligence and Statistics (AISTATS) 2017 –
International Conference on Learning Representations (ICLR) 2017 –
Asian Conference on Computer Vision (ACCV) 2016 –
The British Machine Vision Conference (BMVC) 2017 –
Journal of Machine Learning Research (JMLR)
Springer International Journal of Computer Vision (IJCV)
IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)
IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)
IEEE Transactions on Image Processing (T-IP)
IEEE Transactions on Multimedia (T-MM)
Springer Machine Learning
Artificial Intelligence
IET Computer Vision
Elsevier Waste Management
ACM Transactions on Multimedia (ACM TOMM)

Program committee member of

Association for the Advancement of Artificial Intelligence Conference (AAAI), 2015, 2017
International Joint Conference on Artificial Intelligence (IJCAI), 2015, 2016
IEEE ICDM 2015 Workshop on Practical Transfer Learning
ECCV 2016 Workshop on Transferring and Adapting Source Knowledge in Computer Vision

Mentor of Ph.D. Forum of IEEE WACV 2018

Departmental Services at UCF

Faculty Search Committee 2017 – 2018
Awards Committee of the College of Engineering and Computer Science 2017 – 2018
CRCV Research Associate Search Committee 2016
Nielsen Fellowship Search Committee 2016

Students

Ph.D. students:

Yang Zhang 08/2015 – 12/2017; co-supervised with Hassan Foroosh, 01/2018 – present
Aidean Sharghi 08/2015 – 12/2017; co-supervised with Ali Borji, 01/2018 – 07/2018
Abdullah Jamal 01/2016 – 12/2017; co-supervised with Liqiang Wang, 01/2018 – present
Yifan Ding 01/2016 – 12/2017; co-supervised with Liqiang Wang, 01/2018 – present
Yandong Li 08/2017 – 12/2017; co-supervised with Liqiang Wang, 01/2018 – present
Samer Iskander (teaching assistant, co-supervise with Dr. Niels Lobo) 01/2016 – 05/2016

Remote Ph.D. student at Tsinghua University, China:

Chuang Gan 08/2015 – 01/2018

Master students:

Fareeha Irfan (Google Lime Scholarship and research/teaching assistant) 08/2015 – 08/2017
Suhas Nithyanand (directed research) 08/2016 – 12/2016

Rohan Singh Rajput (independent study) 08/2016 – 12/2016

Defense and candidacy committee member of

Kenneth Thompson (Ph.D., University of Central Florida) 2016
Uzair Tariq (Master, University of Central Florida) 2017
Hong Zhang (Ph.D., University of Central Florida) 2017
Dustin Morley (Ph.D., University of Central Florida) 2018
Maryam Jaberi (Ph.D., University of Central Florida) 2018

Undergraduate students:

Adam Vest, Univ. of Louisville (NSF Research Experiences for Undergraduates (REU)) 2017
Geraldine Versfeld, University of Central Florida (NSF REU) 2017
Truman Thames, Fayetteville State University UNC (NSF REU) 2017
Jacob Scott Laurel, University of Alabama at Birmingham (NSF REU) 2016
Kylie McCarty, University of Central Florida (NSF REU) 2016
Kevin Duarte, University of Central Florida (NSF REU) 2016
Michael Lopez (undergraduate research program) Spring 2016
Adam Albright, University of Central Florida (senior design) 2016 – 2017
Qiang Li, University of Central Florida (senior design) 2016 – 2017
Kyle Ferguson, University of Central Florida (senior design) 2016 – 2017

Selected Honors and Awards

⋆ Tencent Senior VP's Star Award 2018
⋆ NSF Award: CRII #1566511 2016 – 2018
⋆ NSF Award: BIGDATA #1741431 2017 – 2020
⋆ IEEE CVPR 2017 Outstanding Reviewer 2017
⋆ Viterbi School of Engineering Doctoral Fellowship 2011 – 2015
⋆ Neural Information Processing Systems (NIPS) Travel Award 2014
⋆ Postgraduate Studentship, The Chinese University of Hong Kong 2008 – 2010
⋆ Triple-A Outstanding Student of Anhui Province, China 2007
⋆ First Prize (Anhui), second Prize (China), Undergraduate Math Contest in Modeling 2007
⋆ Huawei Scholarship 2006