

Assistant Professor

School of Electrical Engineering and Computer Science
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Citizenship: Chinese citizen, United States permanent resident

Research Interests

Computer vision, machine learning, pattern recognition and natural language processing. Specific interests in segment-based object recognition, scene understanding and semantic segmentation, video object segmentation and recognition, composite statistical inference, large-scale machine learning, Monte Carlo methods, random Fourier methods, kernel methods.

Education

- **Institute of Automation–Chinese Academy of Sciences** Beijing, China
Ph.D., Pattern Recognition and Intelligent Systems Sep. 2003 - Aug. 2008
 - Advisor: Jue Wang
 - Thesis: Euclidean Metric Learning
- **Zhejiang University** Hangzhou, ZJ, China
B.S., Computer Science and Engineering Sep. 1997 - Jun. 2001

Professional Experience

- **Oregon State University** Corvallis, OR, USA
Assistant Professor Sep. 2015 - now
 - Research Topics: Video Segmentation, Deep Learning, Unsupervised Image Segmentation, 3D Reconstruction from Video, Visual Object Tracking.
- **Georgia Institute of Technology** Atlanta, GA, USA
Research Scientist Dec. 2012 - Sep. 2015
 - Supervisor: James M. Rehg
 - Research Topics: Video Segmentation, Unsupervised Image Segmentation, 3D Reconstruction from Video, Affordance Analysis, Continuous-Time Hidden Markov Models, Visual Object Tracking.
- **Georgia Institute of Technology** Atlanta, GA, USA
Postdoctoral Researcher Feb. 2011 - Nov. 2012
 - Supervisor: Guy Lebanon and Haesun Park
 - Research Topics: Sentiment Analysis, Recommender Systems, Random Fourier methods, Composite Statistical Inference, Semantic Segmentation
- **University of Bonn** Bonn, NRW, Germany
Postdoctoral Researcher Sep. 2008 - Dec. 2010
 - Supervisor: Cristian Sminchisescu

- Research Topics: Kernel Methods, Semantic Segmentation, Multiple-Instance Learning, Random Fourier Methods, Kernel/Metric Learning, Pose Estimation

- **Chinese Academy of Railway Sciences** Beijing, China
Programmer *Sep. 2001 - Nov. 2002*
 - Worked on the rail ticket booking system for the Chinese railway network.
 - Worked on: Improving performance of concurrent database requests during peak periods (Chunyun); a ticket price calculator; designing an information sharing system across heterogeneous systems.

Teaching Experience

- **Georgia Institute of Technology** Atlanta, GA, USA
Probabilistic Graphical Models *CS 8803 PGM*
 - 6 lectures, Spring 2014
 - 4 lectures, Spring 2013
- **Georgia Institute of Technology** Atlanta, GA, USA
Machine Learning I *CSE 6740*
 - 2 guest lectures, Fall 2013
- **University of Bonn** Bonn, Germany
Computer Vision *Graduate Course*
 - Tutor and 2 lectures, 2010
- **Peking Union Medical College** Beijing, China
Introduction to Proteomics *Graduate Course*
 - 1 guest lecture every year, 2004-2007
- University of Chinese Academy of Sciences** Beijing, China
Machine Learning Research *Graduate Course*
 - 1 guest lecture every year, 2005-2007

Grants Awarded (Total: 1.59M, sole PI: 287K)

- **CRII: RI: Large-Scale Discovery of Subcategories and Parts from Image and Video Segments**
National Science Foundation (NSF) *Jun. 2015 - May. 2017*
 - Principal Investigator, \$165,375.00
- **Understanding When Neural Networks are going to be Wrong**
Future of Life Institute *Aug. 2015 - Jul. 2018*
 - Principal Investigator, \$121,642.00
- **RI: Small: A Compositional Approach to Video Segmentation**
National Science Foundation (NSF) *Oct. 2013 - Sep. 2016*
 - Co-Principal Investigator (co-PI) with James M. Rehg, \$499,443.00
- **Image Processing, Behavioral Modeling and Environment Modeling**
BMW *Aug. 2014 - Jul. 2017*
 - Co-Principal Investigator (co-PI) with James M. Rehg, \$480,000.00

Comp Cog: Collaborative Research on the Development of

• **Visual Object Recognition**

National Science Foundation (NSF)

Dec. 2015 - Nov. 2018

- Co-Principal Investigator (co-PI) with James M. Rehg, Maithilee Kunda, \$321,099.00
- Collaborative research with Linda Smith and Chen Yu from Indiana University Bloomington

• **NVIDIA Hardware Donation Grant**

NVIDIA Corporation

Feb. 2015

- 2 Tesla K40 GPGPUs (worth about \$7,000)

Honors

- 2009-2012, participation in the PASCAL VOC Segmentation Challenge (Most prestigious challenge in visual object recognition, participants include universities such as University of California – Berkeley, University of Chicago, Stanford University, University of Oxford, etc.).
 - 2009, winner of the comp5 (semantic segmentation, train without additional training data) challenge, test set average precision (AP) 36.5%.
 - 2010, co-winner of the comp5 challenge, AP 39.7%.
 - 2011, winner of the comp5 challenge, AP 43.3%.
 - 2012, winner of the comp6 (semantic segmentation, train with additional training data) challenge (AP 47.5%), 2nd place of the comp5 challenge (AP 45.4%, improved to 47.5% after the challenge is over).
- 2012, Best reviewers award for ACCV 2012.
- 2011, Outstanding reviewer award for ICCV 2011.
- 2010, DAGM Paper Prize.
- 2005, Microsoft Fellowship. \$6,000 (only 40 recipients per year across the entire Asia-Pacific region).
- 2005, First Class Scholarship. Institute of Automation, Chinese Academy of Sciences.
- 2005, Liuyongling Scholarship. Chinese Academy of Sciences.

Publications

Google Scholar Citations=854, h-index=17

My Citations Homepage <http://scholar.google.com/citations?user=snDpfA0AAAAJ&hl=en>

Preprints

1. Fuxin Li, Guy Lebanon, Christian Sminchisescu. A Linear Approximation to the χ^2 Kernel with Geometric Convergence. arXiv:1206.4074. [cs.LG]
2. Fuxin Li, Joao Carreira, Guy Lebanon, Cristian Sminchisescu. Composite Statistical Learning and Inference for Semantic Segmentation. To be submitted.

Journals and Book Chapters

1. Lora Weiss, Erica Briscoe, Heather Hayes, Olga Kemenova, Sim Harbert, Fuxin Li, Guy Lebanon, Chris Stewart, Darby Miller Steiger, Dan Foy. A Comparative Study of Social Media and Traditional Polling in the Egyptian Uprising of 2011. *Social Computing, Behavioral-Cultural Modeling and Prediction*, Springer 2013, pp 303-310.

2. Jaegul Choo, Fuxin Li, Keehyoung Joo, Haesun Park. A Visual Analytics Approach for Protein Disorder Prediction. *Expanding the Frontiers of Visual Analytics and Visualization*, Springer 2012, pp 163-174.
3. João Carreira, Fuxin Li, Cristian Sminchisescu. Object Recognition by Sequential Figure-Ground Ranking. *International Journal of Computer Vision (IJCV)*. (First two authors contributed equally), 2012 (98):3, 243-262.
4. Fen Xia, Yanwu Yang, Liang Zhou, Fuxin Li, Min Cai, Daniel D. Zeng: A closed-form reduction of multi-class cost-sensitive learning to weighted multi-class learning. *Pattern Recognition (PR)* 42(7): 1572-1581 (2009).
5. Chen Shao, Wei Sun, Fuxin Li, Ruifeng Yang, Ling Zhang, Youhe Gao. Oscore: a combined score to reduce false negative rates for peptide identification in tandem mass spectrometry analysis. *Journal of Mass Spectrometry*. 2009(14):1, 25-31.
6. Wei Sun, Yong Chen, Fuxin Li, Ling Zhang, Ruifeng Yang, Zhi Zhang, Dexian Zheng, Youhe Gao. Dynamic urinary proteomic analysis reveals stable proteins to be potential biomarkers. *Proteomics - Clinical Applications*. 2009(3):3, 370-382
7. Fen Xia, Wensheng Zhang, Fuxin Li, Yanwu Yang. Ranking with Decision Tree. *Knowledge and Information Systems*. 2008 (17):3, 381-395.
8. Linjie Wang, Fuxin Li, Wei Sun, Shuzhen Wu, Xiaorong Wang, Ling Zhang, Dexian Zheng, Jue Wang and Youhe Gao. Concanavalin A-captured Glycoproteins in Healthy Human Urine. *Molecular & Cellular Proteomics*. 2006(5): 560 - 562
9. Wei Sun, Fuxin Li, Shuzhen Wu, Xiaorong Wang, Dexian Zheng, Jue Wang, Youhe Gao. Human urine proteome analysis by three separation approaches. *Proteomics*. 2005(5): 4994-5001
10. Fuxin Li, Wei Sun, Youhe Gao, Jue Wang. RScore: A Peptide Randomicity Score For Evaluating MS/MS Spectra. *Rapid Communications in Mass Spectrometry*. 2004(18):14,1655-1659
11. Wei Sun, Fuxin Li, Jue Wang, Dexian Zheng, Youhe Gao. AMASS: Software for Automatically Validating the Quality of MS/MS Spectrum From SEQUEST Results. *Molecular & Cellular Proteomics*. 2004(3): 1194-1199

Conferences

1. Chanho Kim, Fuxin Li, Arridhana Ciptadi, James M. Rehg. Multiple Hypothesis Tracking Revisited. In IEEE International Conference on Computer Vision (**ICCV**), 2015 (**Oral Presentation**).
2. Ahmad Humayun, Fuxin Li, James M. Rehg. The Middle Child Problem: Revisiting Parametric Min-cut for Robust Object Proposals. In IEEE International Conference on Computer Vision (**ICCV**), 2015
3. Zhengyang Wu, Fuxin Li, Rahul Sukthankar, James M. Rehg. Robust Video Segment Proposals with Painless Occlusion Handling. In *IEEE Conference on Computer Vision and Machine Learning (CVPR)*, 2015.
4. Rahul Sawhney, Fuxin Li, Henrik I. Christensen. GASP : Geometric Association with Surface Patches. In *International Conference on 3D Vision (3DV)*, 2014.
5. Abhijit Kundu, Yin Li, Frank Dellaert, James M. Rehg, Fuxin Li. Joint Semantic Segmentation and 3D Reconstruction from Monocular Video. In *European Conference of Computer Vision (ECCV)*, 2014.
6. Ahmad Humayun, Fuxin Li, James M. Rehg. RIGOR: Reusing Inference in Graph Cuts for generating Object Regions. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2014.
7. Fuxin Li, Taeyoung Kim, Ahmad Humayun, David Tsai, James M. Rehg. Video Segmentation by Tracking Many Figure-Ground Segments. In *IEEE International Conference on Computer Vision (ICCV)*, 2013.
8. Tucker Hermans, Fuxin Li, James M. Rehg, Aaron F. Bobick. Learning Contact Locations for Pushing and Orienting Unknown Objects . In *IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2013.
9. Tucker Hermans, Fuxin Li, James M. Rehg, Aaron F. Bobick. Learning Stable Pushing Locations. In *IEEE International Conference on Development and Learning (ICDL)*, 2013.
10. Fuxin Li, Joao Carreira, Guy Lebanon, Cristian Sminchisescu. Composite Statistical Inference for Semantic Segmentation. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.

11. Seungyeon Kim, Fuxin Li, Guy Lebanon, Irfan Essa. Beyond Sentiment: The Manifold of Human Emotions. In *Proceedings of the 16th International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2013.
12. Mingxuan Sun, Fuxin Li, Joonseok Lee, Ke Zhou, Guy Lebanon, Hongyuan Zha. Learning Multiple-Question Decision Trees for Cold-Start Recommendation. In *ACM International Conference on Web Search and Data Mining (WSDM)*, 2013 (Spotlight presentation).
13. Edwards G. Bazavan, Fuxin Li, Cristian Sminchisescu. Learning Random Kernel Approximations for Object Recognition. In *European Conference of Computer Vision (ECCV)*, 2012 (**oral presentation, 2.8% acceptance rate**).
14. Fuxin Li, Guy Lebanon, Cristian Sminchisescu. Chebyshev Approximations to the Histogram Chi-Square Kernel. In *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2012.
15. Catalin Ionescu, Fuxin Li, Cristian Sminchisescu. Latent Structured Models for Human Pose Estimation. In *IEEE International Conference on Computer Vision (ICCV)*, 2011 (**Oral presentation, 3.1% acceptance rate**).
16. Fuxin Li, Cristian Sminchisescu. Convex Multiple Instance Learning by Estimating Likelihood Ratio, *Advances in Neural Processing Systems (NIPS)*, 2010.
17. Fuxin Li, Catalin Ionescu, Cristian Sminchisescu. Random Fourier Approximations for Skewed Multiplicative Histogram Kernels. In *German Association for Pattern Recognition (Deutsche Arbeitsgemeinschaft für Mustererkennung, DAGM)*, 2010. **DAGM prize paper**.
18. Fuxin Li, João Carreira, Cristian Sminchisescu. Object Recognition as Ranking Holistic Figure-Ground Hypotheses. In *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2010 (First two authors contributed equally).
19. Fuxin Li, Cristian Sminchisescu. The Feature Selection Path in Kernel Methods. In *Artificial Intelligence and Statistics (AISTATS)*, 2010.
20. Fuxin Li, Yunshan Fu, Yu-Hong Dai, Cristian Sminchisescu, and Jue Wang. Kernel Learning by Unconstrained Optimization. *Artificial Intelligence and Statistics (AISTATS)*, 2009.
21. Liang Zhou, Fuxin Li, Yanwu Yang. Path Algorithms for One-Class SVM. *International Symposium on Neural Networks (ISNN)*, 2008.
22. Zongying Song, Chunhong Pan, Q Yang, Fuxin Li, Wei Li. Building Roof Detection from a Single High-Resolution Satellite Image in Dense Urban Area. In ISPRS 2008, Congress of the International Society for Photogrammetry and Remote Sensing.
23. Fuxin Li, Jian Yang, Jue Wang. A Transductive Framework of Distance Metric Learning by Spectral Dimensionality Reduction. In Proceedings of *International Conference on Machine Learning (ICML)*, 2007
24. Jian Yang, Fuxin Li, Jue Wang. A Better Scaled Local Tangent Space Alignment Algorithm. In Proceedings of *International Joint Conference on Neural Networks (IJCNN)*, 2005

Invited Talks

Conference and Workshops

Composite Statistical Learning and Inference in Semantic and Video Segmentation: at Perceptual Organization in Computer Vision Workshop, Columbus, OH, USA, June 2014.

Object Recognition by Sequential CPMC Segment Ranking, The PASCAL Visual Object Classes Challenge Workshop 2011, Barcelona, Spain, November 2011.

Universities and Companies

Composite Statistical Learning and Inference, at Rutgers University, Piscataway, New Jersey, USA, September 2014.

Composite Statistical Learning and Inference, at National Institute of Health Clinical Center, Bethesda, Maryland, USA, August 2014.

Composite Statistical Learning and Inference, at Xidian University, Xi'an, China, July 2014.

Composite Statistical Learning and Inference at Baidu Inc., Beijing, China, January 2014.

Composite Statistical Learning and Inference at Samsung Research., Beijing, China, January 2014.

Object Recognition as Ranking Holistic Figure-Ground Hypotheses at Georgia Institute of Technology, Computational Science and Engineering Seminar, Atlanta, GA, USA, February 2012.

Object Recognition as Ranking Holistic Figure-Ground Hypotheses and Convex Multiple Instance Learning: at Tsinghua University, Beijing, China, January 2011.

AMASS: software for automatically validating the quality of MS/MS spectrum from SEQUEST results: at Institute of Computing Technologies, Chinese Academy of Sciences, Beijing, China, December 2005.

Professional Activities

Co-organizer (Fabio Galasso, Fuxin Li, Thomas Brox, Bernt Schiele, James M. Rehg) of the First International Workshop on Video Segmentation, in conjunction with ECCV 2014.

Conference Reviewer: ICCV 2011 (outstanding reviewer) - 2015, ECCV 2012-2014, CVPR 2013-2015, NIPS 2011,2013-2014, ICML 2014-2015, ACCV 2012 (best reviewers) - 2014, CIKM 2012, Supercomputing 2013, IJCAI 2011, Humanoids 2013-2014, AISTATS 2015.

Journal Reviewer: IEEE Transactions in Pattern Analysis and Machine Intelligence (**PAMI**); International Journal on Computer Vision (**IJCV**); Journal of Machine Learning Research (**JMLR**); the Data Mining and Knowledge Discovery Journal (**DMKD**); the Pattern Recognition journal (**PR**); IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**); Computer Vision and Image Understanding (**CVIU**); Journal of Selected Topics in Signal Processing (**JSTSP**); ACM Transactions on Intelligent Systems and Technology (**TIST**); AI Communications (**AIC**); IEEE Transactions on Image Processing (**ITIP**); IEEE Transactions on Circuits and Systems for Video Technology (**JCSVT**); the Neurocomputing Journal.

Student Supervision

- Ahmad Humayun (Georgia Institute of Technology, Ph.D., co-advised with James M. Rehg)
- Chanho Kim (Georgia Institute of Technology, Ph.D., co-advised with James M. Rehg)
- Rahul Sawhney (Georgia Institute of Technology, Ph.D., co-advised with Henrik Christensen)
- Mingxuan Sun (Georgia Institute of Technology, Ph.D., mentored with advisor Guy Lebanon)
- Catalin Ionescu (University of Bonn, Ph.D., mentored with advisor Cristian Sminchisescu)
- Eduard G. Bazavan (Institute of Mathematics of the Romanian Academy, M.S., mentored with advisor Cristian Sminchisescu)

References

- **Dr. James M. Rehg**
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Atlanta, GA, USA
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Website: <http://www.cc.gatech.edu/~rehg/>

- **Dr. Aaron F. Bobick**
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Georgia Institute of Technology
Atlanta, GA, USA
Email: afb@cc.gatech.edu
Website: <http://www.cc.gatech.edu/~afb/>
- **Dr. Guy Lebanon**
Senior Manager, Machine Learning Science
Amazon Inc.
Seattle, WA, USA
Email: glebanon@gmail.com
Website: <http://theanalysisofdata.com/gl/>
- **Dr. Cristian Sminchisescu**
Mathematical Sciences
Lund University
Lund, Sweden
Email: Cristian.Sminchisescu@math.lth.se
Website: <http://www.maths.lth.se/matematiklth/personal/sminchis/index.html>