

Assistant Professor

School of Electrical Engineering and Computer Science
Oregon State University
2077 Kelley Engineering Center
Oregon State University
Corvallis 97331, Oregon
USA

(phone:) (+1) 541-737-5987
lif@eecs.oregonstate.edu
<http://web.engr.oregonstate.edu/~lif/>

Citizenship: Chinese citizen, United States permanent resident

Research Interests

Computer vision and deep learning. Specific interests in video object segmentation and recognition, multi-target tracking, segment-based object recognition, scene understanding and semantic segmentation 3D object recognition; small sample deep learning, adversarial deep learning, explainable deep learning, composite statistical inference.

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

- **Oregon State University** Corvallis, OR, USA
Computer Vision II *CS 637*
 - New course I am developing, on state-of-the-art computer vision approaches
 - To start in Spring 2017
- **Oregon State University** Corvallis, OR, USA
Deep Learning *CS 519-006*
 - New Course I developed, on deep learning across vision, NLP and reinforcement learning
 - Winter 2016, Winter 2017
 - 60 students each year
- **Oregon State University** Corvallis, OR, USA
Data Structures *CS 261*
 - Winter 2016, Winter 2017
 - 100 students each year
- More than 10 guest lectures in *Probabilistic Graphical Models* and *Machine Learning I* in the Georgia Institute of Technology
- Tutor and 2 lectures in *Computer Vision* in the University of Bonn
- 1 guest lecture every year in *Introduction to Proteomics* in Peking Union Medical College, 2004-2007
- 1 guest lecture every year in *Machine Learning Research* in the University of Chinese Academy of Sciences, 2005-2007

Grants Awarded (Total: 12.1M, Georgia Tech portion: 1.2M (when I was there), OSU portion: 9.7M, my share at OSU: ~ 1.5M)

EXACT: Explanation-Informed Acceptance Testing of Deep

- **Adaptive Programs**
DARPA *2017 - 2022*
 - Co-Principal Investigator, project total \$6,545,123 (pending final budget negotiation)
 - OSU portion: \$6,545,123
 - My share: \$949,043
 - Explainable Deep Learning

RESEARCH-PGR: Analysis of Genes Affecting Plant

- **Regeneration and Transformation in Poplar**
National Science Foundation (NSF) *Jan. 2017 - Dec. 2021*
 - Co-Principal Investigator, project total \$4,040,000

- OSU portion: \$2,852,842
- My share: \$266,000
- Interactive segmentation of *in vitro* plants

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

- **Understanding When Neural Networks are going to be Wrong**

Future of Life Institute

Aug. 2015 - Jul. 2018

- Principal Investigator, \$121,642

- **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

Image Processing, Behavioral Modeling and Environment

- **Modeling**

BMW

Aug. 2014 - Jul. 2017

- Co-Principal Investigator (co-PI) with James M. Rehg, \$480,000

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
- 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=1264, h-index=20

My Citations Homepage <http://scholar.google.com/citations?user=snDpfA0AAAAAJ&hl=en>

Preprints

1. Xin Li, Fuxin Li. Adversarial Examples Detection in Deep Networks with Convolutional Filter Statistics. arXiv:1612.07767. [cs.CV]
2. Fuxin Li, Guy Lebanon, Cristian Sminchisescu. A Linear Approximation to the χ^2 Kernel with Geometric Convergence. arXiv:1206.4074. [cs.LG]
3. Fuxin Li, Joao Carreira, Guy Lebanon, Cristian Sminchisescu. Composite Statistical Learning and Inference for Semantic Segmentation. Technical Report.

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. Xingyi Li, Fuxin Li, Xiaoli Fern, Raviv Raich. Filter Shaping for Convolutional Neural Networks. International Conference on Learning Representations (**ICLR**), 2017.
2. Zhaoyang Lv, Chris Beall, Pablo F. Alcantarilla, Fuxin Li, Zsolt Kira, Frank Dellaert. A Continuous Optimization Approach for Efficient and Accurate Scene Flow. In European Conference in Computer Vision (**ECCV**), 2016.

3. Chanho Kim, Fuxin Li, Arridhana Ciptadi, James M. Rehg. Multiple Hypothesis Tracking Revisited. In *IEEE International Conference on Computer Vision (ICCV)*, 2015 (**Oral Presentation**).
4. 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
5. 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.
6. Rahul Sawhney, Fuxin Li, Henrik I. Christensen. GASP : Geometric Association with Surface Patches. In *International Conference on 3D Vision (3DV)*, 2014.
7. 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.
8. 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.
9. 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.
10. 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.
11. Tucker Hermans, Fuxin Li, James M. Rehg, Aaron F. Bobick. Learning Stable Pushing Locations. In *IEEE International Conference on Development and Learning (ICDL)*, 2013.
12. 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.
13. 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.
14. 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).
15. 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**).
16. 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.
17. 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**).
18. Fuxin Li, Cristian Sminchisescu. Convex Multiple Instance Learning by Estimating Likelihood Ratio, *Advances in Neural Processing Systems (NIPS)*, 2010.
19. 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**.
20. 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).
21. Fuxin Li, Cristian Sminchisescu. The Feature Selection Path in Kernel Methods. In *Artificial Intelligence and Statistics (AISTATS)*, 2010.
22. Fuxin Li, Yunshan Fu, Yu-Hong Dai, Cristian Sminchisescu, and Jue Wang. Kernel Learning by Unconstrained Optimization. *Artificial Intelligence and Statistics (AISTATS)*, 2009.

23. Liang Zhou, Fuxin Li, Yanwu Yang. Path Algorithms for One-Class SVM. *International Symposium on Neural Networks (ISNN)*, 2008.
24. 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.
25. 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
26. 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

- Characterizing adversarial examples in deep networks with convolutional filter statistics.* Beneficial AI Workshop, Asilomar, California, January 2017.
- Don't fool me: Characterizing Adversarial Examples in Deep Networks.* AAAI Workshop on AI safety. Phoenix, AZ, February 2016.
- 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

Regression Methods in Video Object Discovery and Tracking

- Baidu Research (Nov. 2015)
- Google Research (Nov. 2015)
- Oregon State University (Oct. 2015)

Composite Statistical Learning and Inference

- University of Indiana-Bloomington (Mar. 2015)
- Oregon State University (Feb. 2015)
- Rutgers University (Sept. 2014)
- National Institute of Health Clinical Center (Aug. 2014)
- Xidian University (Jul. 2014)
- Baidu Inc. (Jan 2014)
- Samsung Research (Jan. 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

NSF Panel Reviewer, 2017.

Area Chair: CVPR 2017

Co-organizer (Katerina Fragkiadaki, Fabio Galasso, Fuxin Li, Thomas Brox, Bernt Schiele, James M. Rehg, Michael Ying Yang) of the Second International Workshop on Video Segmentation, in conjunction with ECCV 2016.

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) - 2017, ECCV 2012-2016, CVPR 2013-2016, NIPS 2011,2013-2016, ICML 2014-2016, ACCV 2012 (best reviewers) - 2014, CIKM 2012, Supercomputing 2013, IJCAI 2011, Humanoids 2013-2014, AISTATS 2015-2017.

Associate Editor: The Neurocomputing Journal

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

Present

- Jialin Yuan (Oregon State University, Ph.D.)
- Xingyi Li (Oregon State University, Ph.D., co-advised with Xiaoli Fern)
- Lawrence Neal (Oregon State University, Ph.D., co-advised with Xiaoli Fern)
- Robert DeBortoli (Oregon State University, Ph.D., co-advised with Geoff Hollinger)
- Rahul Sawhney (Georgia Institute of Technology, Ph.D., co-advised with Charles Isbell, visiting Oregon State University from June 2016 - May 2017)
- Zheng Zhou (Oregon State University, M.S.)
- Alrik Firl (Oregon State University, M.S.)

Past

- Xin Li (Oregon State University, M.S. graduated 2016)
- Ahmad Humayun (Georgia Institute of Technology, Ph.D., co-advised with James M. Rehg)
- Chanho Kim (Georgia Institute of Technology, Ph.D., mentored with James M. Rehg)
- 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)

Committee Services

Ph.D. Thesis Committee, Kai Li
Ph.D. Thesis Committee, Michael Lam
Ph.D. Thesis Committee, Sheng Chen
Ph.D. Thesis Committee, Anirban Roy
Ph.D. Qualification Committee, Kimia Tajik
Ph.D. Qualification Committee, Zheng Liu
Ph.D. Qualification Committee, Gurjeet Singh
Ph.D. Qualification Committee, Hamed Shahbazi
M.S. Thesis Committee, Huanqun Jiang
M.S. Thesis Committee, Alexander Zatopa, defended Nov. 2016
M.S. Thesis Committee, Gungor Basa, defended Nov. 2016
M.S. Thesis Committee, Revathy Priyanga Narasimhan, defended Nov. 2016
M.S. Thesis Committee, Krishna Sai Allani, defended Sept. 2016
M.S. Thesis Committee, Moriah Biederman, defended Sept. 2016
M.S. Thesis Committee, Ryan Skeelee, defended Jun. 2016
B.S. Honors Thesis Committee, Jonathan Van Why, defended Feb. 2016
M.S. Thesis Committee, Vikedo Terhuja, defended Dec. 2015

References

- **Dr. James M. Rehg**
School of Interactive Computing
Georgia Institute of Technology
Atlanta, GA, USA
Email: rehg@cc.gatech.edu
Website: <http://www.cc.gatech.edu/~rehg/>
- **Dr. Aaron F. Bobick**
School of Interactive Computing
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>