

## Summary

Data science expert with research experience in statistical signal processing, distributed inference in sensor networks, and information theory. Expertise in modern statistical methods, including deep neural networks, graphical models, reinforcement learning, and time series analysis. Expertise in Python data science related libraries, R, and Linux.

## Experience

- Nov. 2016 – present **Senior Inventive Scientist**, *AT&T Labs-Research*, Middletown, NJ.
- Built deep neural network based models to identify street poles and their attributes via street-view map images. This project aims to save substantial amount of dollars spent on site-inspection for small cells deployment.
  - Researched and designed machine learning algorithms to detect hacking activities, device purchase fraud, and other security threats. This project aims to increase AT&T's visibility to malicious cyber-activities, and protect enterprise users from cyber-crimes.
  - Mentored summer intern on the project that created Natural Language Processing and text mining models to extract from internet resources the government regulations on telecom device mounting.
- Fall 2017 **Adjunct Assistant Professor**, *Columbia University*, New York.
- Taught graduate-level course: ELEN6873 Detection and Estimation Theory
  - Mentored visiting scholar and Ph.D. student

## Education

- 2012–2017 **Ph.D. in Electrical Engineering**, *Columbia University*, New York.  
Advisor: Prof. Xiaodong Wang
- 2010–2012 **M. Phil. in Electronic and Computer Engineering**, *Hong Kong University of Science and Technology*, Hong Kong.  
Advisor: Prof. Matthew McKay
- 2006–2010 **B.S. in Electrical Engineering and B.A. in Economics (double major)**, *Peking University*, Beijing.  
Advisor: Prof. Lingyang Song

## Publications

### Journal

- [1] **Shang Li**, Xiaoou Li, Xiaodong Wang, and Jingchen Liu, "Sequential Hypothesis Test with Online Usage-Constrained Sensor Selection", accepted to *IEEE Trans. on Information Theory*, to appear in 2019.
- [2] **Shang Li** and Xiaodong Wang, "Fully Distributed Sequential Hypothesis Testing: Algorithms and Analyses", *IEEE Trans. on Information Theory*, vol. 64, no. 4, pp. 2742-2758, Apr. 2018.
- [3] **Shang Li**, Xiaoou Li, Xiaodong Wang, and Jingchen Liu, "Decentralized Sequential Composite Hypothesis Test Based on One-Bit Communication", *IEEE Trans. on Information Theory*, vol. 63, no. 6, pp. 3405-3424, Jun. 2017.

- [4] **Shang Li** and Xiaodong Wang, "Optimal Joint Detection and Estimation Based on Decision-Dependent Bayesian Cost", *IEEE Transactions on Signal Processing*, vol. 64, no. 10, pp. 2573-2586, May 2016.
- [5] **Shang Li** and Xiaodong Wang, "Cooperative Change Detection for Voltage Quality Monitoring in Smart Grids", *IEEE Trans. on Information Forensics and Security*, vol. 11, no. 1, pp. 86-99, Jan. 2016.
- [6] **Shang Li**, Yasin Yilmaz, and Xiaodong Wang, "Quickest Detection of False Data Injection Attack in Wide-Area Smart Grids", *IEEE Trans. on Smart Grid*, vol. 6, no. 6, pp. 2725-2735, Nov. 2015.
- [7] **Shang Li** and Xiaodong Wang, "Quickest Attack Detection in Multi-Agent Reputation Systems", *IEEE Journal of Selected Topics in Signal Processing*, vol. 8, no. 4, pp. 653-666, Aug. 2014.
- [8] **Shang Li**, Matthew McKay, and Yang Chen, "On the Distribution of MIMO Mutual Information: An In-Depth Painlevé-Based Characterization", *IEEE Trans. on Information Theory*, vol. 59, no. 9, pp. 5271-5296, Sep. 2013.
- [9] Leian Chen, **Shang Li**, and Xiaodong Wang, "Quickest Fault Detection in Photovoltaic Systems", *IEEE Trans. on Smart Grid*, vol. 9, no. 3, pp. 1835-1847, May 2018.
- [10] Ziyu Guo, **Shang Li**, Xiaodong Wang, and Wei Heng, "Distributed Point-Based Gaussian Approximation Filtering for Forecasting-Aided State Estimation in Power Systems", *IEEE Trans. on Power Systems*, vol. 31, no. 4, pp. 2597-2608, Jul. 2016.
- [11] Yasin Yilmaz, **Shang Li**, and Xiaodong Wang, "Sequential Joint Detection and Estimation: Optimum Tests and Applications", *IEEE Trans. on Signal Processing*, vol. 64, no.20, pp. 5311-5326, Jun. 2016.

#### Conference

- [12] **Shang Li** and Xiaodong Wang, "Asymptotic Optimality of Consensus-Based Sequential Probability Ratio Test", *The 42nd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 5-9 Mar., New Orleans, 2017.
- [13] **Shang Li**, Xiaoou Li, Xiaodong Wang, and Jingchen Liu, "Optimal Sequential Test with Finite Horizon and Constrained Sensor Selection", *IEEE Int. Sym. on Inf. Theory (ISIT)*, 10-15 Jul., Barcelona, 2016.
- [14] **Shang Li**, Xiaoou Li, Xiaodong Wang, and Jingchen Liu, "Multi-Sensor Generalized Sequential Probability Ratio Test Using Level-Triggered Sampling", *IEEE Global Conference on Signal & Information Processing*, 15-18 Dec., Orlando, FL, 2015.
- [15] **Shang Li** and Xiaodong Wang, "Joint Composite Detection and Bayesian Estimation: A Neyman-Pearson Approach", *IEEE Global Conference on Signal & Information Processing*, 15-18 Dec., Orlando, FL, 2015.
- [16] **Shang Li**, Yasin Yilmaz, and Xiaodong Wang, "Sequential Cyber-Attack Detection in the Large-Scale Smart Grid System", *IEEE Int. Conf. on Smart Grid Communications*, 2-5 Nov., Miami, FL, 2015.
- [17] **Shang Li** and Xiaodong Wang, "Monitoring Disturbances in Smart Grids Using Distributed Sequential Change Detection", *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, 15-18 Dec., St. Martin, 2013. — **Finalist of the Best Student Paper.**
- [18] **Shang Li**, Matthew McKay, and Yang Chen, "Characterizing the mutual information distribution of MIMO systems: Beyond the Gaussian approximation", in proc. of the 46th Annual Asilomar Conference on Signals, Systems, and Computers.

- [19] **Shang Li**, Yang Chen, and Matthew McKay, “Mutual information distribution of interference-limited MIMO: A joint Coulomb Fluid and Painlevé based approach”, in proc. of the 45th Annual Asilomar Conference on Signals, Systems, and Computers.. — **Finalist of the Best Student Paper**. See [here](#).

[Preprint](#)

- [20] **Shang Li** and Xiaodong Wang, “Distributed Sequential Hypothesis Testing with Quantized Message-Exchange”, *Submitted to IEEE Trans. on Information Theory*.

---

## Invited Talks

- Mar. 2017 International Conference on Acoustics, Speech and Signal Processing, New Orleans  
Oct. 2016 Intel Labs, San Jose  
Sep. 2016 BMW Technology, Chicago  
Apr. 2016 New England Statistics Symposium, Yale University, New Haven  
Feb. 2016 Department of Statistics, Columbia University, New York  
Nov. 2011 Asilomar Conference on Signals, Systems, and Computers, Pacific Grove

---

## Referee

- Journal IEEE Transactions: Information Theory, Automatic Control, Signal Processing, Signal and Information Processing over Networks, Wireless Communication, Aerospace and Electronic Systems, Smart Grid, Power Systems  
IEEE Internet of Things Journal  
Security & Privacy (Wiley)  
Signal Processing (Elsevier)  
Statistica Sinica  
Conference ICC'2014, ICC'2017, ITW'2013, ISIT'2014, SPCOM'2014, BMSB'2016

---

## Awards

- 2018 Collaborative Research Award, Electrical Engineering Department, Columbia University  
2013 Wei Family Foundation Scholarship, Columbia University  
2013 Finalist of the Best Student Paper Award at CAMSAP  
2011 Finalist of the Best Student Paper Award at Asilomar Conference  
2010 HKUST Graduate Scholarship  
2009 Peking University Chun-Tsung Undergraduate Research Grant  
2009 Peking University SK Scholarship

---

## Computer Skills

- Operating Systems Unix/Linux, Mac OS, Windows  
Programming Languages Python (TensorFlow, Keras, scikit-learn, Pandas), R, Matlab, C++,  $\text{\LaTeX}$

(update: February 16, 2019)