

# Kai Yang

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## Education

**Shanghai Institute of Microsystem and Information Technology**, Shanghai, China & **University of Chinese Academy of Sciences**, Beijing, China

Ph.D. candidate in Communication and Information Systems, 09/2017-07/2020 (expected)

- Advisor: [Prof. Yuanming Shi](#)
- Research Topic: Sparse and Low-Rank Optimization for Mobile Edge Artificial Intelligence

**Dalian University of Technology**, Dalian, China

B.E. in Electronic Engineering, 09/2011-07/2015

- Advisor: [Prof. Yanqing Guo](#)
- School of Information and Communication Engineering 09/2013-07/2015
- Faculty of Electronic Information and Electrical Engineering 09/2011-07/2013

## Honors and Awards

- Outstanding Graduates of ShanghaiTech University, 2020
- National Scholarship for Graduate Students, 2017
- Student Merit Award, University of Chinese Academy of Science, 2017
- Student Merit Award, ShanghaiTech University, 2016

## Experience

**University of Toronto**, Ontario, Canada

Visiting student, 01/2019-01/2020

- Host: [Prof. Wei Yu](#)

**WeBank**, Shenzhen, China

Intern in FATE group of WebankFinTech team, 07/2019-09/2019

**University of California, Berkeley**, California, USA

Visiting student in BeSTEC program, 10/2016-02/2017

- Host: [Prof. Martin J. Wainwright](#)

## Research Interests

My research interests include sparse and low-rank optimization, manifold optimization, machine learning, and their applications to dense wireless networks and distributed computing systems:

- convex and nonconvex optimization
- mobile edge artificial intelligence
- edge computing and caching
- intelligent IoT

## Publications

### *Book Chapters*

1. Y. Shi, **K. Yang**, and Y. Yang, “Generalized Low-Rank Optimization for Ultra-Dense Fog-RANs,” in *Ultra Dense Networks: Principles and Technologies*, Cambridge University Press, 2019.

### *Survey and Magazine Papers*

1. Y. Shi, **K. Yang**, T. Jiang, J. Zhang, and K. B. Letaief, “Communication-efficient edge AI: algorithms and systems,” *IEEE Commun. Surveys Tuts.*
2. **K. Yang**, Y. Shi, Y. Zhou, Z. Yang, L. Fu, and W. Chen, “Federated machine learning for intelligent IoT via reconfigurable intelligent surface,” *IEEE Netw.*
3. **K. Yang**, Y. Zhou, Z. Yang, and Y. Shi, “Communication-efficient edge AI inference over wireless networks,” *ZTE Commun.*

### *Journal Articles*

1. **K. Yang**, Y. Shi, W. Yu, and Z. Ding, “Energy-efficient processing and robust wireless cooperative transmission for edge inference,” *IEEE Internet Things J.*
2. **K. Yang**, T. Jiang, Y. Shi, and Z. Ding, “Federated learning via over-the-air computation,” *IEEE Trans. Wireless Commun.*, vol. 19, no. 3, pp. 2022-2035, Mar. 2020.
3. **K. Yang**, Y. Shi, and Z. Ding, “Data shuffling in wireless distributed computing via low-rank optimization,” *IEEE Trans. Signal Process.*, vol. 67, no. 12, pp. 3087-3099, Jun. 2019.
4. **K. Yang**, Y. Shi, and Z. Ding, “Generalized low-rank optimization for topological cooperation in ultra-dense networks,” *IEEE Trans. Wireless Commun.*, vol. 18, no. 5, pp. 2539-2552, May 2019.
5. J. Dong, **K. Yang**, and Y. Shi, “Ranking from crowdsourced pairwise comparisons via smoothed Riemannian optimization,” submitted.
6. J. Dong, **K. Yang**, and Y. Shi, “Blind demixing for low-latency communication,” in *IEEE Trans. Wireless Commun.*, vol. 18, no. 2, pp. 897-911, Feb. 2019.

### Conference Papers

1. **K. Yang**, T. Jiang, Y. Shi, and Z. Ding, "Federated learning based on over-the-air computation," in *Proc. IEEE Int. Conf. Commun. (ICC)*, Shanghai, China, May 2019.
2. T. Jiang, **K. Yang**, and Y. Shi, "Pliable data shuffling for on-device distributed learning," in *Proc. IEEE Int. Conf. Acoust. Speech Signal Process. (ICASSP)*, Brighton, UK, May 2019.
3. **K. Yang**, Y. Shi, and Z. Ding, "Low-rank optimization for data shuffling in wireless distributed computing," in *Proc. IEEE Int. Conf. Acoust. Speech Signal Process. (ICASSP)*, Alberta, Canada, Apr. 2018.
4. J. Dong, **K. Yang**, and Y. Shi, "Blind demixing for low-latency communication," in *Proc. IEEE Wireless Commun. Networking Conf. (WCNC)*, Barcelona, Spain, Apr. 2018.
5. **K. Yang**, Y. Shi, and Z. Ding, "Generalized matrix completion for low complexity transceiver processing in cache-aided Fog-RAN via the Burer-Monteiro approach," in *Proc. IEEE Global Conf. Signal and Inf. Process. (GlobalSIP)*, Montreal, Canada, Nov. 2017.
6. J. Dong, **K. Yang**, and Y. Shi, "Ranking from crowdsourced pairwise comparisons via smoothed matrix manifold optimization," in *ICDM Workshops on Data-driven Discovery of Models (D3M)*, New Orleans, Louisiana, USA, Nov. 2017.
7. **K. Yang**, Y. Shi, J. Zhang, Z. Ding and K. B. Letaief, "A low-rank approach for interference management in dense wireless networks," in *Proc. IEEE Global Conf. Signal and Inf. Process. (GlobalSIP)*, Washington, DC, Dec. 2016.
8. **K. Yang**, Y. Shi, and Z. Ding, "Low-rank matrix completion for mobile edge caching in Fog-RAN via Riemannian optimization," in *Proc. IEEE Global Commun. Conf. (Globecom)*, Washington, DC, Dec. 2016.

## Technical Backgrounds

### Mathematics

Matrix Analysis                      Stochastic Processes

### Optimization

Convex Optimization                      Riemannian Optimization

### Applied Mathematics and Engineering

Machine Learning                      Federated Learning      Communication Theory      Detection and Estimation

## Computer Skills

Matlab, Python.