PENGKUN YANG

Center for Statistical Science ⋄ Tsinghua University
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RESEARCH INTERESTS

At the intersection of statistics, machine learning, optimization, and information theory, my research focuses on machine learning problems from the perspective of high-dimensional statistics, and sublinear algorithms for property testing and estimation.

EDUCATION

University of Illinois at Urbana-Champaign May 2016 – Aug. 2018
Ph.D. in Electrical and Computer Engineering Advisor: Yihong Wu
Dissertation: "Polynomial methods in statistical inference: theory and practice."

University of Illinois at Urbana-Champaign Aug. 2013 – May 2016
M.S. in Electrical and Computer Engineering Advisor: Yihong Wu
Thesis: "Optimal entropy estimation on large alphabet: fundamental limits and fast algorithms"

Tsinghua University Sept. 2009 – June 2013
B.E. in Electronic Engineering Advisor: Zhisheng Niu

WORK EXPERIENCE

Tsinghua University From Mar. 2021
Assistant Professor, Center for Statistical Science

Princeton University Oct. 2018 – Oct. 2020
Postdoc Research Associate, Department of Electrical Engineering

AWARDS AND HONORS

Thomas M. Cover Dissertation Award, 2020
IEEE Information Theory Society

Shun Lien Chuang Memorial Award for Excellence in Graduate Education, 2018
University of Illinois at Urbana-Champaign

Jack Keil Wolf ISIT Student Paper Award, 2015
IEEE International Symposium on Information Theory (ISIT)

Star of Tomorrow Internship Award of Excellence, 2013
Microsoft Research Asia (MSRA)

Tsinghua-Tung OOCL Scholarship for Comprehensive Excellence, 2012
Tsinghua University, China

Tsinghua-Changhong Scholarship for Comprehensive Excellence, 2011
Tsinghua University, China

MONOGRAPHS

(α-β) denotes alphabetical ordering.

1. Y. Wu, **P. Yang**, (α-β)
   "Polynomial methods in statistical inference: theory and practice,"
   Foundations and Trends (FnT) in Communications and Information Theory 17 (4), 402-586, 2020.

JOURNAL PUBLICATIONS

1. Y. Wu, **P. Yang**, (α-β)
   "Optimal estimation of Gaussian mixtures via denoised method of moments,"
   Annals of Statistics, Volume 48, Number 4, pp. 1981-2007, 2020.

2. D. Tao, **P. Yang**, H. Feng,
   "Utilization of text mining as a big data analysis tool for food science and nutrition,"
   Comprehensive Reviews in Food Science and Food Safety, Volume 19, Number 2, pp. 875-894, 2020.

3. Y. Wu, **P. Yang**, (α-β)
   "Chebyshev polynomials, moment matching, and optimal estimation of the unseen,"
   Annals of Statistics, Volume 47, Number 2, pp. 857-883, 2019.

4. Y. Wu, **P. Yang**, (α-β)
   "Sample complexity of the distinct elements problem,"
   Mathematical Statistics and Learning, Volume 1, Issue 1, pp. 37-72, 2018.

5. Y. Wu, **P. Yang**, (α-β)
   "Minimax rates of entropy estimation on large alphabets via best polynomial approximation,"
   IEEE Transactions on Information Theory, Volume: 62, Issue: 6, pp. 3702–3720, 2016.

CONFERENCE PUBLICATIONS

1. L. Su, **P. Yang**, (α-β)
   "On learning over-parameterized neural networks: a functional approximation perspective,"
   in Proceedings of Advances in Neural Information Processing Systems (NeurIPS) , pp. 2641–2650, Vancouver, Canada, Dec. 2019.

2. Y. Wu, **P. Yang**, (α-β)
   "Optimal entropy estimation on large alphabets via best polynomial approximation,"
   in Proceedings of IEEE International Symposium on Information Theory (ISIT), pp. 824–828, Hong Kong, China, Jun. 2015.

   Jack Keil Wolf ISIT Student Paper Award

3. T. Zhao, **P. Yang**, H. Pan, R. Deng, S. Zhou, Z. Niu,
   "Software defined radio implementation of signaling splitting in hyper-cellular network,"
   in Proceedings of the second workshop on Software radio implementation forum (SRIF), ACM SIGCOMM, pp. 81-84, Hong Kong, China, Aug. 2013.

   Full version available at arXiv:1312.0720 , Dec. 2013.

4. J. Cao, R. Xia, **P. Yang**, C. Guo, G. Lu, L. Yuan, Y. Zheng, H. Wu, Y. Xiong, D. Maltz,
   "Per-packet load-balanced, low-latency routing for clos-based data center networks,"
   in Proceedings of ninth ACM conference on Emerging networking experiments and technologies (CoNEXT), pp. 49-60, Santa Barbara, California, United States, Dec. 2013.

MANUSCRIPTS

1. C. Fang, J. Lee, **P. Yang**, T. Zhang, (α-β)
   "Modeling from Features: a Mean-field Framework for Over-parameterized Deep Neural Networks," *arXiv:2007.01452*.
2. N. Doss, Y. Wu, **P. Yang**, H. Zhou, (α-β)
   "Optimal estimation in the high-dimensional Gaussian mixture model," *arXiv:2002.05818*.

SELECTED TALKS

1. Optimal estimation of Gaussian mixtures via denoised method of moments
   - Information Theory and Applications, Graduation Day, San Diego, CA, Feb. 2018
   - Invited seminar, Carnegie Mellon University, Pittsburgh, PA, Apr. 2018
   - Conference on Data Science for Business and Economics, Purdue University, West Lafayette, IN, May 2018
   - Invited seminar, Tsinghua University, Beijing, China. Jun. 2019
2. Optimal entropy estimation on large alphabets via best polynomial approximation
   - **Semi-plenary speaker**, IEEE International Symposium on Information Theory, Hong Kong, China, Jun. 2015

PROFESSIONAL SERVICE

Reviewer for *Annals of Statistics, Bernoulli Journal, Electronic Journal of Statistics, IEEE Transactions on Information Theory, IEEE Journal on Selected Areas in Information Theory, Communications in Statistics, Journal of Educational and Behavioral Statistics, Conference On Learning Theory (COLT), IEEE International Symposium on Information Theory (ISIT), IEEE International Conference on Network Protocols (ICNP).*

PROGRAMMING SKILLS

C/C++/C#, Python, Java, MATLAB, Mathemetica, LaTeX, Lisp